£1 Vol 2 No. 7.

COMMODORE
COMPUTING INTERNATIONAL

Adventure Games - The inside story

Vic + 64 + Pet = Macro Micro

Plotters Exposed !

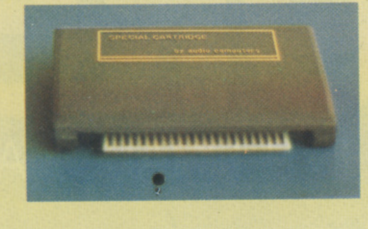
The independent magazine for all Commodore computer users

CANADA/USA $3.50 GERMANY 6DM FRANCE Fr 18.5
70151

FROM AUDIO-COMPUTERS (SOLIDISK) THIS MONTH:

NEW LOW PRICES ON VIC-20 HARDWARE ADD-ONS AND THE INTRODUCTION OF NEW SOFTWARE CARTRIDGES

If you have already bought a memory cartridge for your VIC-20 computer, we still have many exciting items to offer, under the heading 'FURTHER EXPANSION'. They are perfectly compatible with all Commodore and many other manufacturers products.



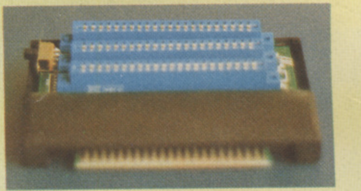
NEW LOW PRICE ON 16K MEMORY CARTRIDGE:

Any program sold for the VIC-20 with 8k or 16k extra memory will run with the SRC16.
The NEW PRICE of the SRC16 is now only £27.00, including VAT and manual.
It is important to know what else you can do with the SRC16 other than running big programs.
1) The SRC16 can be upgraded to 32k bytes of RAM at a fraction of the cost of a 16k cartridge. This upgrade costs only £11.00
2) The SRC16 has an X-ROM SOCKET. Games or utilities ROMs such as SCREEN ROM or SOUND ROM can be bought separately and used in this socket. Each software ROM costs around £5-10.00.
3) The SCR16 can have an EXPANSION SLOT built in. This important fact should be noted, since many VIC users experience fitting problems and extra expense when adding a Programmer's AID toolkit cartridge or the Machine Code Monitor Cartridge to their system. With many other low cost 16k memory cartridges, the user will have to buy a multi slot motherboard just to accommodate any extra cartridges. This feature alone could save you as much as £20! The SLOT is the exact reproduction of the expansion port into which the SRC16 is inserted and will cost you only £3.00. Right now you can choose any of the extra features to be built into your SRC16 cartridge. Simply tick the option boxes shown.

FURTHER EXPANSION TO THE VIC-20 COMPUTER:

1) 3 SLOT MOTHERBOARD:

for those for whom it's too late to buy a SRC16 cartridge or who want more than just memory. The 3 Slot MOTHERBOARD is not without special interest:
a) A Memory Select System allows the user to add the memory capacity of 2 RAM cartridges — for example, an SRC16 and a Commodore VIC-1111 can be used together to provide 32k bytes.
b) An optional 8k Memory System, very flexible, that will give 11775 bytes free or 6655 bytes free in the Low Res area or occasionally 8k bytes at $A000 to $BFFF for developing your own Autostart program can be added. Furthermore, if you then add your SRC16, you will get 28159 bytes free for your VIC 20!
c) 2 EPROM SOCKETS: this feature is very much appreciated by most users and has been added only very recently. You can use either 4k EPROMs (2732) or 8k EPROMs (2764) in these sockets. Each EPROM can be activated individually exactly as if you had 2 extra cartridges in your system!



2) THE VIC EPROM PROGRAMMER: (uses 2764 Eproms)

We would need a whole page to describe this exciting peripheral for your VIC-20. Briefly, the cartridge works a little like a Disk. You can insert the VIC EPROM PROGRAMMER (VEP for short) into the SLOT and activate it with:

```
SYS 39000
```

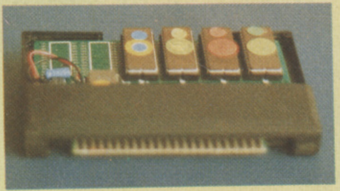
On the VEP, you will find 4 EPROM sockets. Now type in 'C' to display the catalog. It will show what is in every EPROM. It could be like this:

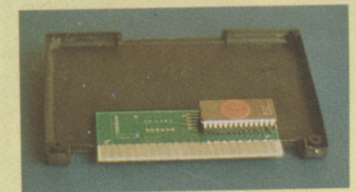
```
1. BIGBASIC
2. UTILITY
3. AUTOSTART GAME
4. BLANK EPROM
```

Simply enter 'R.1' to read the first program. You will instantly see:

```
*READING BIGBASIC
*READING OK
READY
```

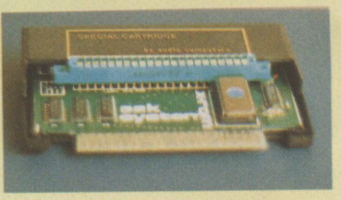
Now you can list it, print it, run it etc. . .
The VEP does the loading of a 16k program in about 3 seconds with no loading error unless you have a bad RAM; it will then list out all the dead or missing bytes!
To put a program into EPROM, load it from tape or disk, activate the VEP and enter 'W PROGRAM-NAME' — very simple to do.
Other useful commands provided by the VEP include Hex Memory Display, Memory Change, Memory Fill, Memory Transfer, Save a Block of Memory, Load Tape, Cold Start, Centronics Printer Drivers etc. . .
You can put Basic, utility or autostart games onto Eprom in a similar way. The VEP will work out where your program is stored and will scan the EPROMs to find enough space to put it.
You can also use it as a self contained Eprom programmer to program, verify and copy Eproms.
Utility and Autostart EPROMs made with the VEP can be used on our Motherboard or on our BLANK SOFTWARE CARTRIDGES and used as any software cartridges.
We supply a small manual together with the VEP showing how you can write an Autostart program, in Basic and in machine code. We will also supply you with a free Blank EPROM and a free Blank Software Cartridge to get you started.
A word of warning: we have developed this equipment to help users in materialising sellable software (we are very keen to buy) and will disclaim any illegal use of it.





SOFTWARE CARTRIDGES

(insert directly into back of VIC, into Motherboard or SRC slot).
1) SCREEN CARTRIDGE: Sets the screen size within limits as small or large as you like. You can for example set the screen to 40 lines × 80 columns and a 'window' of 25 lines × 30 columns, write a letter or draw a colourful playing board and move your window with control keys or joystick. As you are typing in, the window will move along to accommodate. Basic programs can be typed in, listed and run even in 80 column format. Price £10.00.
2) SOUND CARTRIDGE: transforms your VIC into an electric organ. You can play music with the keyboard, add a second voice when it plays the 1st, a 3rd when it plays back the 1st and 2nd etc, define ENVELOPE to create effects like wailing police siren, play music within basic program without slowing the speed of Basic. In short, the sound Rom makes the VIC as tuneful as the BBC micro or the ATARI. Price: £10.00
These 2 cartridges are also available in chip form. You can use the chips in the Motherboard or in the X-ROM socket of your SRC16. Price: £8.00 for either of the 2.
3) MORE CARTRIDGES will be released. We would like to market your programs in cartridge form. Alternatively, we can supply blank cartridges at very competitive prices for commercial use. We are just a phone call away so if you have a good idea, why not give us a ring?



SUMMARY	PRICE/U INCL. VAT
SRC16	£27.00
OPTIONAL EXTRAS FOR THE SRC16:*	
UPGRADE TO 32K	£11.00
EXPANSION SLOT:	£3.00
FURTHER EXPANSION:	
3 SLOT MOTHERBOARD:	£19.95
OPTIONAL EXTRA 8K FOR MOTHERBD*	£16.00
VIC EPROM PROGRAMMER (+ free gift)	£39.00
EXTRA 2764 BLANK EPROM:	£6.00
BLANK SOFTWARE CARTRIDGE:	£3.00
SOFTWARE CARTRIDGES:	
SCREEN CARTRIDGE:	£10.00
SCREEN ROM ONLY:	£8.00
SOUND EFFECT CARTRIDGE:	£10.00
SOUND EFFECT ROM only:	£8.00
Post and packing:	£1.00
TOTAL:	

*I enclose a cheque/postal order payable to SOLIDISK LTD for £:
*Please charge my Access/Barclay credit card account No:
(*Please delete/complete as applicable)

. . . .

Signature

Name: Mr/Mrs/Miss: . . . .

Address: . . . .
. . . .
. . . .

Please note: optional extras cannot be purchased alone. Also, if you wish to purchase them at a later date, SRCs and Motherboards must be returned together with the appropriate payment + £1 P+P. We regret we cannot accept orders of less than £10.00. All prices include VAT at 15%. Europe: deduct VAT, add £3.

Official UK dealers:

SUMLOCK, Manchester, Norman DAVIS, Mill Hill, GODFREY'S, Basildon, CURRY'S MICROSYSTEM chain store.

Official European distributors:

Benelux: ECD, Delft Tel 015 134429.
France: RUN informatique sarl, Paris Tel (01) 581 5144.
Germany: VOBIS Data computer GMBH, Aachen Tel (0241) 50 00 81.
SCHAEFER, Roetgen Tel (0240) 88 319.
Italy: SOLIDISK Italia, Inglesias (CA), Tel 0781 22529.
Portugal: LANDREY Engineering, Lisboa Tel 681243.
Sweden and Norway: DIGILOG, Goteborg Tel 031 20 29 00.

Thank you for the interest shown. Marketing Manager: H. PERRY

TO: SOLIDISK TECHNOLOGY LIMITED
(T/A AUDIO COMPUTERS)
87 BOURNEMOUTH PARK ROAD
SOUTHEND ON SEA
ESSEX SS2 5JJ UK

OUR TELEPHONE NUMBER:

CREDIT CARD SALES/
DEALER ENQUIRIES:
0702 618144

ENQUIRIES:
0702 613081

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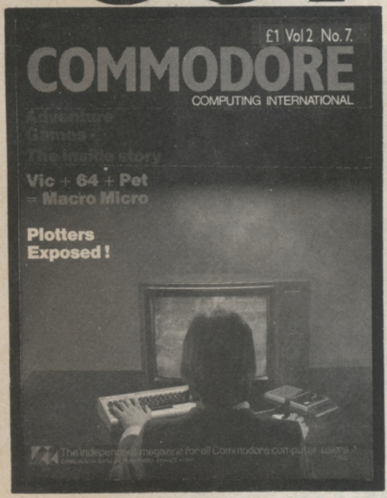
COMPUTING INTERNATIONAL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COMMODORE
COMPUTING INTERNATIONAL
Adventure Games - The Inside story
Vic + 64 + Pet = Macro Micro
Plotters Exposed!

COVER STORY
ADVENTURE GAMES

Not satisfied with just playing adventure games we wanted to know how they actually work. Here are the results of our investigations... Now you can invent your own adventure games. PAGE 14.

Published by Nick Hampshire Publications, 167-169 Great Portland Street, London W1.

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Subscriptions 01-636 6354

Distribution by Magnum Distribution Ltd, Chronicle House, 72-78 Fleet Street, London EC4Y 1HY.
Printed by Ambassador Press, Radlett Road, Colney Street, Radlett, St Albans, Herts AL2 2EG.
Commodore Computing International is an entirely independent monthly magazine and has no connection with Commodore Business Machines UK Ltd.

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ISSN 0265-475X

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NEXT ISSUE

MUSIC MICRO, PLEASE! We show you how to connect a keyboard kit to your CBM 64... with full instructions and special programs.

GIFTS GALORE...Commodore Computing International presents a guide to Christmas gifts for owners of Commodore machines ... from inexpensive little stocking fillers to luxury gifts for the committed Commodore convert.

Simplify all your work with numbers -

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The 3 dimensional program that's a hit with users all over the world!

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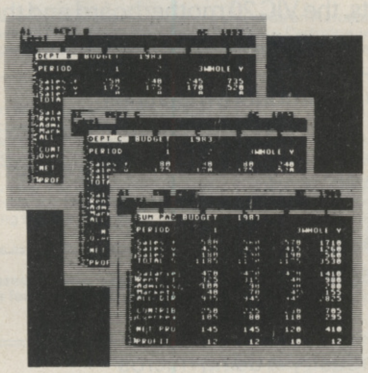
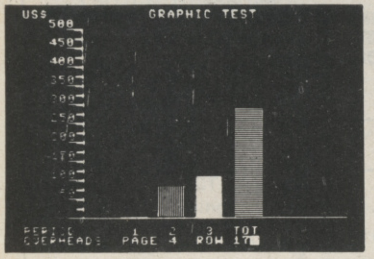


CalcResult's powerful three dimensional spread sheet format rapidly becomes an irreplaceable tool for those involved in figure manipulation and relationship. Budgets reports, statements, forecasts and planning are all areas in which a saving in time and resources are as important as the ability to handle all forms of calculations. The many features of CalcResult simplify the rapid production and calculation of all aspects of business forecasting and planning. Each model can have up to 32 pages of associated information with a consolidated report and every page has 63 × 254 data positions which can contain text, formulas or values. CalcResult's powerful editing functions mean rapid creation and amendment of models and, once created, split screens and multiple page viewing allow easy review of information.

● GRAPHIC REPRESENTATION



CalcResult can translate rows of columns of numbers into histograms on the screen or printed histograms can be used to enhance presentation of tabular information in reports. (With CalcResult 64 full colour options are available on the screen.)

● HELP FUNCTION AND AN EXPLICIT MANUAL

CalcResult is simple to use and easy to learn thanks to a detailed instruction manual and help screens that are available at the touch of a button, to explain the functions available for each command.

● FLEXIBLE PRINTING

CalcResult allows you to define your own report layout. You can choose the order of columns to be printed and set the width of each independently. Layout definitions can be stored on a disk for future use.

● TIME SAVING COMMANDS AND CONDITIONAL FUNCTIONS

Commands like replicate, copy, move, go to, insert and delete make CalcResult simple and easy to use. CalcResult calculates according to correct mathematical priority and has standard functions for statistics, trigonometry and logarithms. Conditional functions like IF THEN ELSE and OR AND NOT allow greater flexibility in the setting up of models. Once created, all formulas are protected from accidental deletion.

CalcResult is available for the business and home user . . .

Advanced CalcResult, with the three dimensional capability, is available for the Commodore 700, 8000 and 64 computers—with a disk drive. A special home or small business version, Easy CalcResult 64, is available as a cartridge. Because this does not require a disk drive the three dimensional, graphic and help function features are not available but even so Easy CalcResult 64 is as powerful as the traditional spread sheets previously only available on expensive business micro computers.

PRICES: EASY CALCRESULT 64 £69 ADVANCED CALCRESULT 64 £109 CALCRESULT 8000 £199 CALCRESULT 700 £225 ALL PRICES PLUS VAT

CalcResult is only available from

KOBRA

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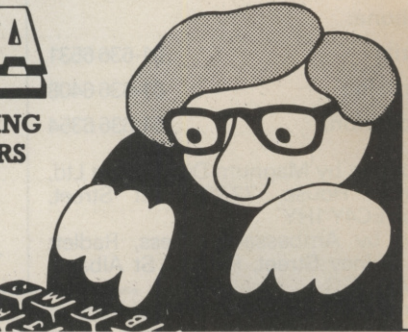

Kobra Micro Marketing,
P.O. Box 28,
Henley-on-Thames, Oxon.
Telephone
(0491) 572512

SEND IN THIS COUPON NOW FOR DETAILS

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Please send details of the exciting CalcResult program. I am interested in:

CalcResult 700 ☐ CalcResult 8000 ☐
CalcResult 64 ☐ Easy CalcResult 64 ☐

Name____

Address______________________________________

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NEWS

Quick draw

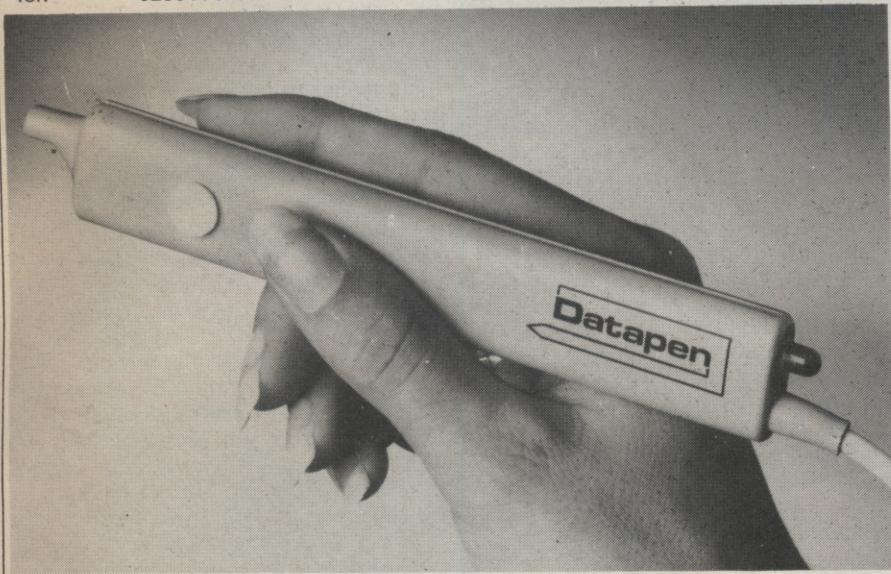
Despite the economic recession, new companies seem to be springing up all over the place, one of which is Datapen Microtechnology Limited who are marketing a light pen suitable for the VIC 20. According to the sales director Pam Rayner, "most light-pens on the market are difficult to use because the operator has little or no control over the pen's data capture as the pen approaches the screen."

Datapen claim that this problem is alleviated with their product which has an LED readout showing that data is available and a switch has been built into the casing that allows the operator to signal when the position is right.

Along with each pen, Datapen are giving away a series of example programs outlining user routines and what they call a 'Freehand Drawing Program.'

The pen is available at £25 and other products in the pipeline include bar code readers, a digitising pad and a mouse. However, dealers are required to support the products.

Area: *Light pens*
Company: *Datapen Microtechnology Limited*
Address: *Kingsclere Road, Overton, Hants. RG25 3JB*
Tel: *0256 770488*



Save the world

If you have ever played any of the games from Thorn EMI Video Limited, you'll know how good they are. If you have ever seen the film War Games, you'll know how good that is. What happens if you combine the two?

Answer: a highly promising sounding game called Computer War which is based on the hit movie. Designed for the VIC 20, the game comes on cassette and is for one player only.

The aim of the game is exactly the same as the plot in the film. The computer at the North American Air Defence System has been tapped into and the nuclear war simulation program activated! The computer cannot tell the difference between the simulation and the real thing and you have got to act pretty quickly to prevent the destruction of the world. Joystick and 3K RAM required.

This is just one of Thorn's releases for the VIC, the other being Medieval Joust which is again on cartridge requiring joystick or keyboard control.

In this game you have insulted the king and have been disloyal to the throne of England. To save your life you joust with, and defeat, seven of the king's most fearless knights.

Area: Games
Company: *Thorn EMI Video Limited*
Address: *Thorn EMI House,*
Upper Saint Martin's Lane,
London WC2H 9ED
Tel: *01-836 2444*

64 Assembler

Supersoft announce the release of Mikro 64, a fast 6510/6502 assembler for the 64 which is supposed to make programming in Machine Code almost as easy as programming in BASIC.

The 64 descendant of the version for the PET allows source files on disk or tape to be linked to create Machine Code programs up to 12K in length. These source files can be saved, loaded, verified and edited and the Mikro cartridge also includes a machine code monitor and disassembler. Some copies have even been sold to software houses like Imagine, Rabbit and Romik.

The cost of Mikro 64 is £50 plus VAT.

Area: *Assemblers*
Company: *Supersoft*
Address: *Winchester House,*
Canning Road, Wealdstone,
Harrow HA3 7SJ
Tel: *01-861 1166*

Joysticks from Manchester

Sumlock Microware have just announced the availability of a new joystick for the VIC 20 and the 64 called the Pro Ace.

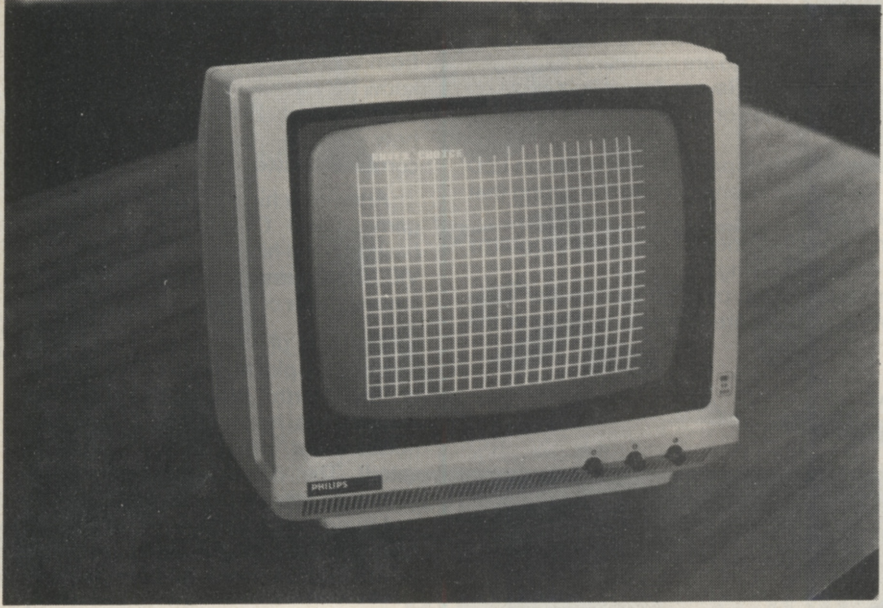
The plastic moulded case is designed to fit snugly in the hand and the plastic stick has a steel shaft running down the middle to provide extra strength.

There are two fire buttons, one on the top of the stick and the dual action fire button at the front of the base for left or right handed playing. The joystick is fitted with a 1.5 metre cable with the standard D9 connector to suit Commodore machines. Along with this there is a non-slip non-scratch rubber base pad.

The cost of the joystick is £12.95 and should be available from computer retailers or direct from Sumlock Microwave.

Area: *Joysticks*
Company: *Sumlock Microwave*
Address: *198 Deansgate,*
Manchester M3 3NE
Tel: *061 834 4233*

NEWS



Philips Video

The TP200 monitor is now available from Philips and is aimed at the personal computer market. This is a mains-powered 12 inch monochrome monitor with a composite video input cable that is compatible with most of today's microcomputers.

The 80×25 character resolution display appears on a green anti-glare screen and viewing the display in comfort is achieved with the help of the extendable stand that fits the base of the display which enables the front of the unit to be raised, tilting the screen to the correct angle for individual users.

There are two distributors at the moment, EMCO Limited in London and Vako Displays Limited in Oldham.

Area: *Monitors*
Company: *Philips*
Address: *Philips Digital Recording Department c/o MEL, Manor Royal, Crawley, Surrey*
Tele: *0293 28787*

Business on the 64 and 20

Small business can profit from the efforts of Specific Software Limited who have designed a suite of accounting and bookkeeping programmes for the 64 and the 20 with 16K RAM.

The suite comprises of a sales accounts program, sales invoicing program and a purchases accounts program.

The purchases accounts provides a daybook with VAT details, ledger accounts, remittance advices, overheads and purchases analysis, creditors analysis and cash analysis. Also included are supplier address labels

The sales accounts program includes a daybook, ledger accounts, statements, sales analysis, debtor analysis, cash analysis and address labels. There is also the option to include an integrated invoicing function which permits the generation of a complete sales invoice.

All the programs are available on disk or tape. The disk versions have a capacity of 300 accounts and 2000 transactions and the tape versions have a capacity of 60 accounts and 300 transactions.

Invoicing on tape and disk for the VIC 20 costs £20 and £35 respectively, sales accounts costs £25 and £100 respectively and purchases accounts cost £25 and £100 respectively.

There is no VIC 20 tape version of the sales account with integrated invoicing but the disk for this cost £120. On the 64, the invoicing on tape and disk costs £30 and £45 respectively, sales accounts costs £75 and £120 respectively and purchases accounts costs £75 and £120 respectively. Once again there is no tape version of the sales account with integrated invoicing, but the disk version costs £150.

Area: *Business accounts*
Company: *Specific Software Limited*
Address: *10 Farlands Road, Stourbridge, West Midlands*
DY8 2DD
Tele: *03843 73377*

Armchair shopping

So who said that ordering goods from the comfort of your own armchair was a thing of the distant future? Certainly not Club 403!

What is Club 403? This is a package of regularly updated news, information and services which uses the Prestel service and is designed specifically for the consumer at home. All you need to have to access the the information is a telephone, a specialy adapted television set which can accept viewdata transmissions as well as normal television and teletext channels, a microcomputer and a monthly subscription to Club 403.

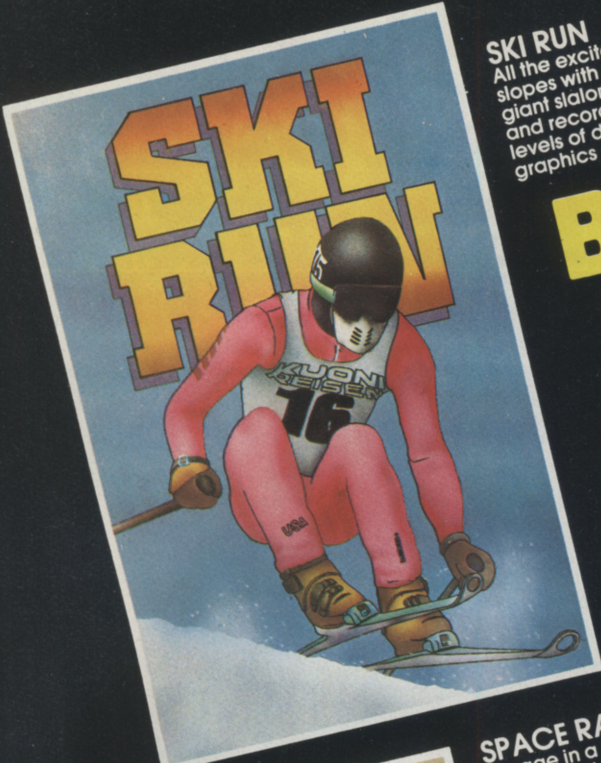
With the aid of a modem and a telephone the signals can be translated and displayed onto the screen. The flow of information is not just one way. Just as anybody can talk back down a telephone line, so a Club 403 user can talk back to the source of information using a simple keyboard.

This service is a major step forward in communications in that, unlike Oracle and Ceefax, it allows for a far greater range of dialogue flow. For instance, through your own television set it is now possible to carry out transactions with your bank, transfering cash from one account to another, make theatre bookings, order your shopping and send messages to friends. In other words, the shops, theatres, banks etc are no longer just buildings on the high street because they actually come into your home.

Despite all this, Club 403 is still going through its trial period in the West Midlands area although this should prove to be successful and the service should be extended to other areas of the country.

The cost of joining the club from an equipment point of view and on a rental basis is about three pounds more than the current monthly rental charge of the teletext set. As a special introductory offer, the first 2,500 members to join the club will not have to pay this charge for the first six months. From a subscription point of view, membership costs 4 pounds per month which replaces the normal Prestel subscription and includes computer access and time charges. The only other bill you will need to consider is the local rate telephone charge.

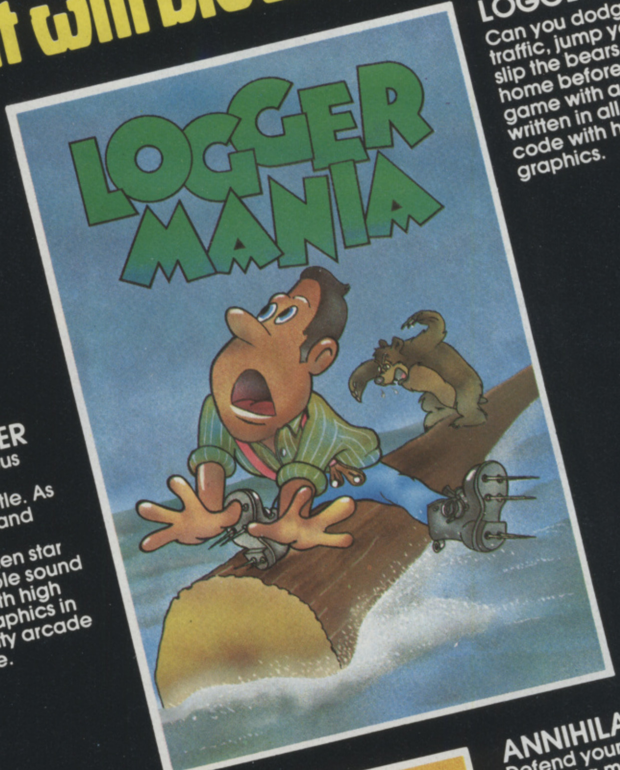
Area: *Communications*
Company: *Club 403*
Address: *8/10 Colmore Circus,*
Queensway, Birmingham
B4 6AT
Tele: *021-236 8277*



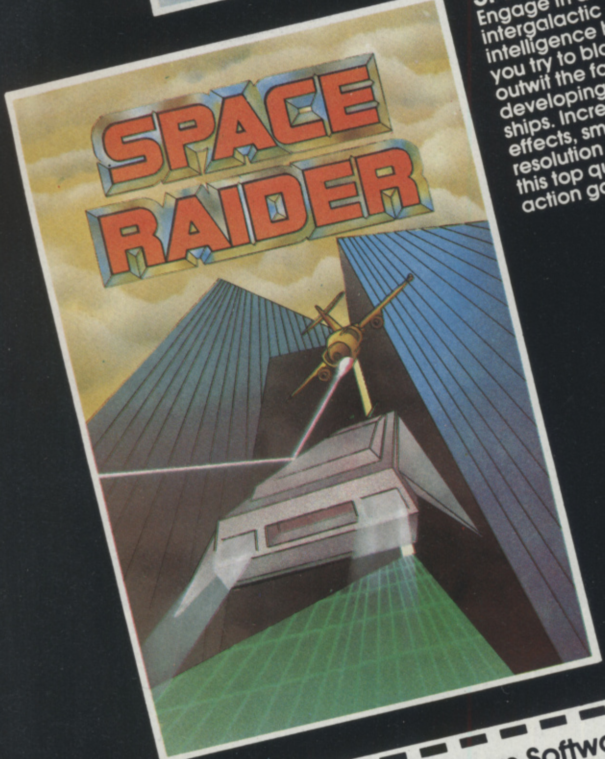
SKI RUN
All the excitement and skill of the ski slopes with downhill, slalom and giant slalom. Put yourself to the test and record the fastest time! Nine levels of difficulty. High quality graphics and brilliant sound effects!!

Boom Software
It will blow your mind

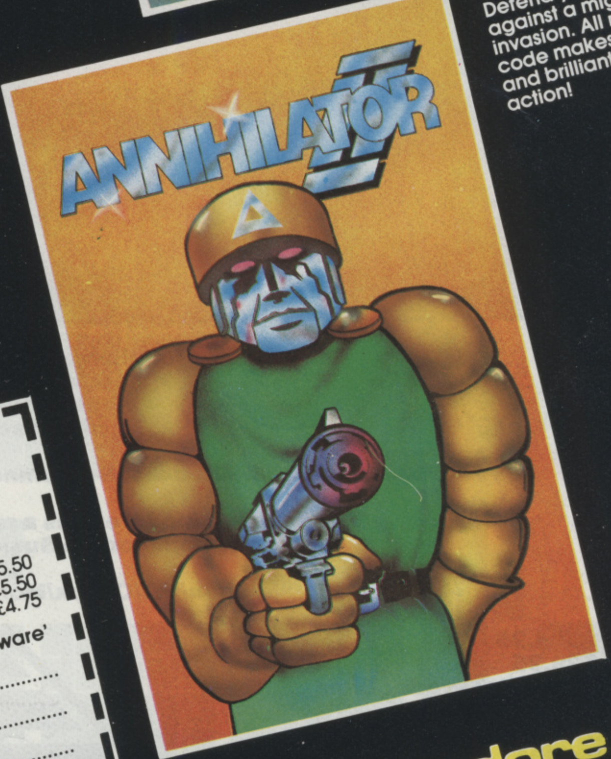
LOGGER MANIA
Can you dodge the traffic, jump your logs, slip the bears, and get home before sunset? A game with a difference written in all machine code with high quality graphics.



SPACE RAIDER
Engage in a furious intergalactic battle. As intelligence battle. As you try to blast and outwit the fast developing alien star ships. Incredible sound effects, smooth high resolution graphics in this top quality arcade action game.



ANNIHILATOR II
Defend your planet against a mighty allien invasion. All machine code makes for fast and brilliant arcade action!



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commodore 64
and VIC 20

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for ▫ the ▫ commodore ▫ 64

**challenge the asteroid field,
maneuver the caves of ice,
experience the thrill,
play laser strike.**

Laser strike, written in full machine language for the Commodore 64.

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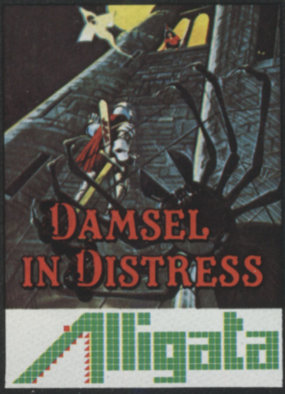

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SOFTWARE WITH BITE

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*These are the registered Trade Marks of the individual companies concerned.

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NEWS

Inmac-culate Cassette File

Inmac are now offering a compact cassette case which has a capacity to store 18 cassettes. Covering the cassettes is a heavy gauge smoke-tinted acrylic top protecting the tapes from unwanted dust and liquids.

The case itself is in a slanted design which is supposed to enable easy identification, access to and removal of tapes.

Another feature of the desktop file is the non-slip feet that provide extra security when the unit is used on smooth surfaces. In this case you can have all this for £33.

Inmac have also got something for the storage of floppy disks. This time it comes in the form of a case moulded from glass reinforced polyester that protects floppies from heat, warping and electromagnetic distortion. There is a lock built into the handle and the case is fully inter-locking to prevent disc damage from contaminants. There is enough storage space to accommodate 30 floppies in three separate drawers which can be removed if required. The cost of this is £34.

Both products carry one year warranties and, like all other Inmac products, is available on a 30 day risk-free trial period with next day delivery.

Area: Storage
Company: *Inmac UK Limited*
Address: *Davy Road, Astmoor,*
Runcorn, Cheshire WA7 1PZ
Tel: *09285 67551*

Conflicting genders

Inmac are back in the new product news again, this time with a gender changer that makes it easy to reconfigure terminals by joining RS232 cables whose genders conflict.

As you should know, females have holes and males have pins and thus attempting to connect two of the same gender is a little difficult to say the least.

Inmac's answer is a small compact unit which consists of two RS232/V24 25 pin connectors placed back to back. All the 25 pins are live so they should work any EIA cables you have.

Both male to male and female to female connectors are available at £20. They carry a one year guarantee and a 30 day trial period. I wonder if Inmac have bothered to inform the British Medical Association about this product?

Area: *Interfacing*
Company: *Inmac*
Address: *Davy Road, Astmoor, Runcorn, Cheshire WA7 1PZ*
Tel: *09285 67551*

Virgin go by bus

Computers are literally being taken to the people all around the country not via the means of any high powered electronic technology that sits in the corner of your home – but by the good old bus!

The idea here is for the double decker to tour the nations major towns and educate those of us who are relatively computer illiterate. The bus is furnished with 12 computers and screens including the VIC and 64 so that people can see computers at work and play games. Some of Virgin's programmers will be available to answer questions on almost any aspect of computing from how to write games to careers in computing.

To coincide with the tour, which will be from October to Christmas, Virgin have launched two new games for the VIC, these being Envahi and Creepers.

Colour Diskettes

Counting House Products Limited is a new company designed solely to cater for Centech Diskettes which are new to this country.

Most diskettes are practically the same in appearance and performance so what is so special about Centech diskettes is that they come in a range of ten colours with the possibility of producing customised colours. The idea behind this colouring is that it will make finding and filing the diskettes that much easier.

The manufacturers claim that all the diskettes meet and exceed double density standards and thus results in greater performance and reliability.

The life of the diskette is also quite exceptional. A single track has been under continuous operation for more than 200 hours under normal office conditions and still met the ANSI specifications. The diskettes are available in boxes of ten or in cases of ten boxes.

Area: *Diskettes*
Company: *Counting House Products Limited*
Address: *123 Green End Road, Hemel*
Hempstead, Hertfordshire
HP1 1RT
Tel: *0442 54845*

Fire Protection

General Monitors have just developed an ultraviolet flame detection system to prevent any computer room fire from destroying irreplaceable records and disrupting business.

The unit is made up of a compact controller suitable for rack, panel or wall mounting, together with remotely located ultraviolet flame detectors. Should any fire occur the warning given out by the system is provided by flashing lights on the control unit although the controller may also be wired up to give automatic activation of other emergency response equipment like system shutdown and sprinkler systems.

Both systems are, claim the manufacturers, insensitive to sunlight and ordinary room lighting and incorporate a self-testing facility.

Area: *Security*
Company: *General Monitors*
Address: *Peter House, Oxford Street,*
Manchester M1 5AU
Tel: *061 228 3116*

Quick Counting on the 64

A product that has just been released should appeal to the small shopkeeper. It is a boookkeeping system designed to be used on the 64.

The system is based around the Cash Book Analyser and the Purchase Day Book. There is also the opportunity to enter the daily takings into the system to produce a Weekly Takings Summary, Trial Balance, Trading Account, Profit and Loss Account and Balance Sheet. With regards to VAT, this account can also be produced although only schemes A and B can be calculated.

The system comes on a cassette although a disc based version is optional and the price of the software is £78 plus VAT. Most Commodore dealers should stock the product, although if you have difficulty in obtaining it, contact Quick-Count Limited.

Area: *Bookkeeping*
Company: *Quick-Count Limited*
Address: *15 Neeld Crescent,*
London NW4
Tele: *01-202 5486*

Uvipac EPROM Eraser

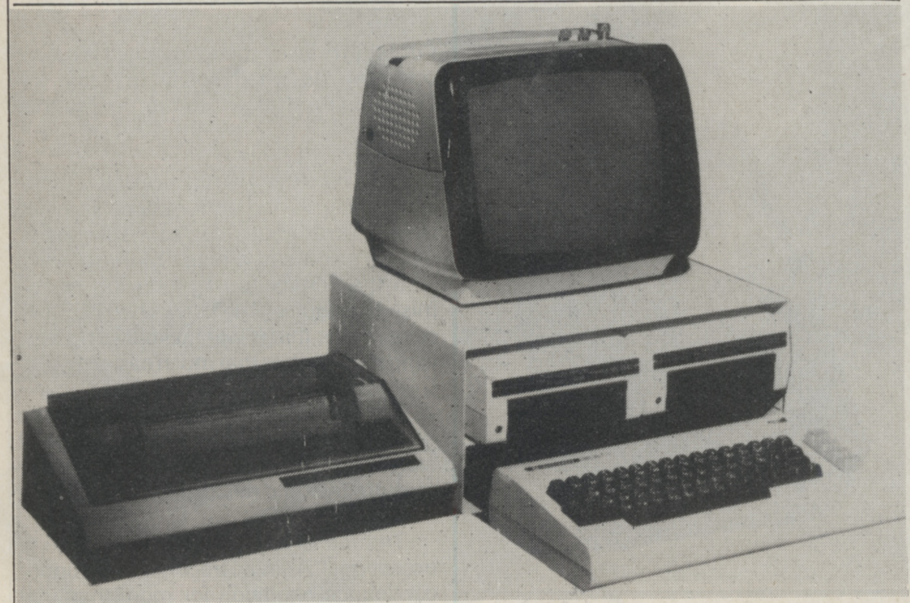
Ground Control say that they will have a new, cost effective way to erase EPROM's in the shops by mid-October.

The product is called the Uvipac and is designed specifically for the home computer user. The 230 Volt mains powered unit allows up to three EPROM's of any size, or one CPU with an on-board EPROM to be erased in five to 20 minutes.

What happens is this the EPROM's are simply loaded into the conductive foam pad which is supplied and inserted into the unit. An optical fibre indicator shows that the unit is in operaton and once the required period has elapsed, all you do is switch the unit off and take the EPROM's out. The Uvipac can be supplied with a built-in fixed 15 minute timer as an optional extra.

On its own, the Uvipac costs £19.95 and with the timer the cost is £24.95. For postage and packing add £1.50.

Area: *EPROM's*
Company: *Ground Control*
Address: *Alfreda Avenue,*
Hullbridge, Essex, SS5 6LT.
Telephone: *0702 230324*



Stacking the micro

Are you a little bit short of space for your disk drives and your monitor? Is everything standing on top of everything else without regard for the damage that this can cause? If so, get stacked!

The A-Stack for the monitor and disk drives has been produced by Newscope Developments Limited. It has been designed with the VIC 20 and the 64 in mind, but could also cater for other home computers.

Attractively finished in a cream or black matt coating, the steel construction has rubber pads fitted to the base to prevent damage to surfaces.

Optional extras include a multi-way power connector and a hinged bookstand. The cost of the main unit is £24.50 which includes VAT, post and packing.

Area: *Home accessories*
Company: *Newscope Developments Limited*
Address: *14 Edward Street, Westbury, Wiltshire BA13 3BD*
Tel: *0373 864644*

Cash in one Microcache

Microcosm Research Limited – the innovators of RAM disks in their silicon disk system – have brought out another product called Microcache which increases file access speed, claim the manufacturers, by 50,000% and still remains transparent to the user, This packages monitors and stores disk records in a separate memory area for RAM to RAM transfer and all you have to do is load it into your system.

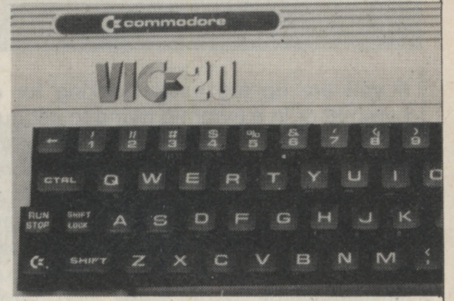
The software prevents unnecessary disk accesses by means of a highly intelligent buffer between the drives and the user. The use of algorithms ensures that records required most often are automatically stored in the RAM 'cache.' In addition to this, a track buffering system is included to increase the speed of the accesses that are required. The more RAM you add, the greater the speed improvement.

The 8 bit version costs £295 and the 16 bit version costs £195.

Area: *File access*
Company: *Microcosm Research Limited*
Address: *26 Danbury Street,*
London N1 8JU
Tel: *01-226 9092*

IS THIS THE FUTURE OF COMMODORE?

Over the last few weeks, more than a few interesting rumours have been working their way over to these shores from the USA, all of them concerning Commodore.



Our contacts in the States have noticed that experts on the New York Stock Exchange are predicting a take-over bid by Commodore of the Zilog Corporation which is currently owned by the Exxon Oil Corporation over the next few months.

The significance of this is not immediately apparent until you realise that it is this corporation which produces the 8 bit X80 microprocessor as well as the high-end 16 bit Z8000 microprocessor and its family of interface chips. These chips are designed specifically with the 16 bit machine in mind which begs the question of what Commodore are going to do with the chips. The most sensible assumption would be that Commodore are preparing to introduce a completely new range of 16 bit machines.

Our American correspondents seem to confirm this assumption. Commodore recently held a conference in the States on the future of Commodore which was attended by representatives from a few top computer firms. During this conference in an off-the-record statement, a high level source in Commodore USA said that such machines were being designed that would replace Commodore's current range of machines and that these machines would be available at first in the States during the spring of 1984. Should this prove to be true, it would mean that all present Commodore machines – including the 64 – would become officially 'dead'. Since that statement Commodore have kept a discreet profile and have said no more on the subject, a pattern which follows the usual management procedure. Such a silence often indicates that the original plans have been converted into an actual full scale project that is being carried out with serious intent.

Commodore are obviously trying to protect their own market interests by being deliberately vague and misleading. However, we are aware of some of the details of these machines if and when they become available. Most of the machines will be similar in appearance and design to that of the VIC and the 64 in that they will use the UNIX operating system first developed by Bell Laboratories and rapidly becoming a standard 16 bit operating system. The machines will also have the ability to talk to each other. Commodore are also active in the design of a huge multi-user system and the inference here is that the smaller 64-look-a like machines will be used as terminals.

Whatever the case may be, software houses and users of Commodore machines should not begin to panic as the new range of machines are planned to be compatible with existing Commodore software.

TERMINAL SOFTWARE

THE BEST ON CASSETTE for the Commodore 64
SUPER SKRAMBLE!

"An excellent game" said Computer & Video Games magazine (Sept '83). Personal Computer News (15-21 Sept '83) gave SUPER SKRAMBLE! an overall rating of NINETEEN OUT OF TWENTY and described it as: "Well implemented with beautifully smooth scrolling and very nice graphics."

FROM THE SAME AUTHOR

"SUPER GRIDDER"
"a compelling piece of frivolity that could give hours of fun". Was the of verdict of Personal Computer News (22-28 Sept '83).

"SUPER DOGFIGHT"
The first 64 games cassette to have SIMULTANEOUS TWO-PLAYER ACTION - realistic sound effects too.

PRINCIPAL WHOLESALE DISTRIBUTORS
UK: PCS Blackburn; Centresoft W. Midlands; Softshop London.
Europe: Aashima Trading B.V., Rotterdam; Wico-soft, Dusseldorf; Tial Trading, Malmo, Fisketjon Data Import, Norway.
Australia: Ozisoft, Sydney.
New Zealand: Alpine Computing Ltd.

Dixons Software Express
LASKYS
GREENCHIP at Debenhams

TERMINAL SOFTWARE
28 CHURCH LANE, PRESTWICH, MANCHESTER M25 5AJ.
TEL 061 773 9313

ANATOMY
OF AN ADVENTURE GAME

If you are up the jungle looking for a pyramid or in a pyramid trying to get out or maybe on the bridge of the star cruiser R29, you will probably be more comfortable doing it sitting in front of a micro-computer. So people write and play adventure games. Writing a simple adventure game is not as hard as writing a simple arcade game, after you have decided on your solutions to the main problems.

The main problems are: computer memory required, linking places together, storing the positions of objects and interpreting commands. Below are some simple solutions to these problems and a demonstration adventure game called "ON THE WAY TO THE INTERVIEW"

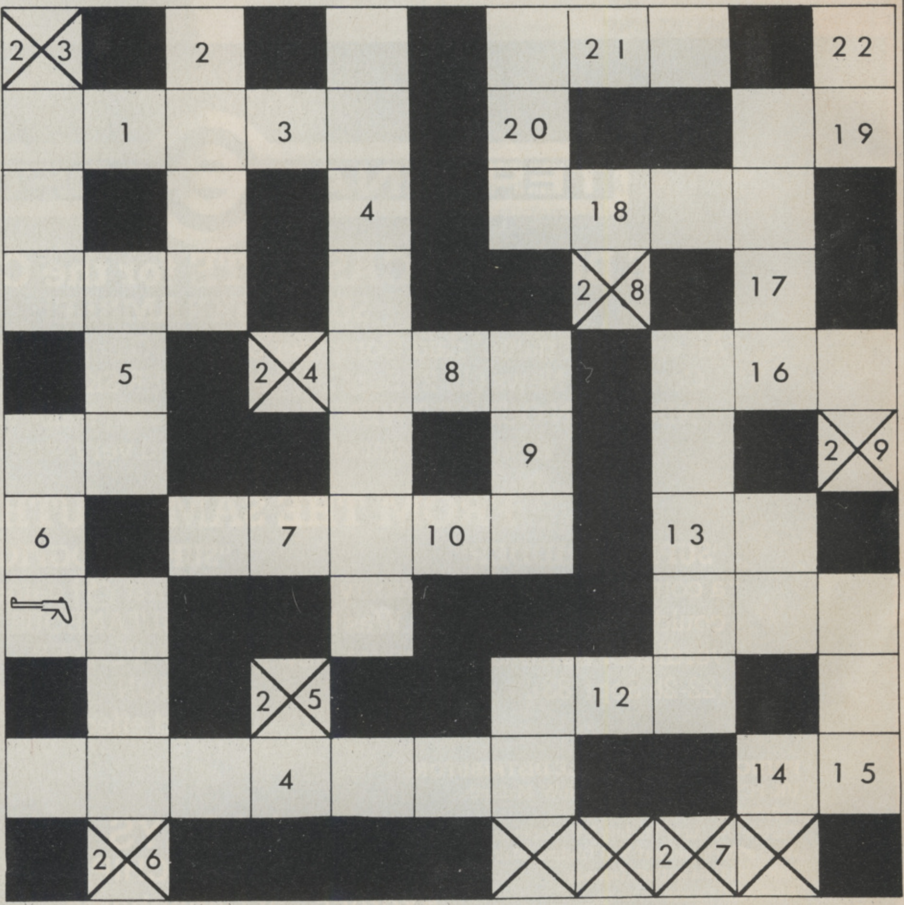
Adventure games use more memory than most other types of computer game so if you are using a VIC 20 plug in your expansion board etc. The main cause of this is amount of text required for object descriptions, room descriptions and messages to the player. Comments on saving memory will be included below.

The main problem is linking one place or room to another, there are quite a few good solutions to this. The simplest, however, is to have variables say GN GS GE GW which when the player enters a room or place are set to the room numbers of the room north or south etc. of the current room respectively, so that when a command like "GO NORTH" is given the variable containing the current room number can be given the value of GN by the routine to interpret commands. No path existing in direction north could be indicated by giving GN a value that could not be a room number say −1 or 255, this could then be tested for and a message printed. For this game we will use an array called MAP(n,n) to store this information but in a different form. MAP is initialised to look like a blank crossword puzzle the value zero being the black bits you can't go on. Any other number being the number of a street description or a building description number. This data structure only allows you to move north south east and west not north-east etc. Moves in other directions like through holes etc can have their own special checks.

A good way of storing the positions of objects is to have each object numbered in the same way as the rooms normally are. Then have an array to store the room numbers of objects. In the game below I have called this array OB(n) and it contains the room numbers of the objects or −1 if the object is being held. So if the command to drop object number 5 in room 8 is given after all the checks have been done to see if it was being held in the first place etc then all that needs to be done is OB(5)=8 and object 5 is now in room 8.

Interpreting commands

This is probably the longest part of the program and does most of the work after the data is set up. This part of the program can be very easy or very very hard. Depending on how complex the commands are you want it to work on. One and two word commands are not too bad. If you are going to have a small number of verbs eg. DROP, GET, GO etc. then you can get away with simple tests like IF A$="DROP GUN" THEN ... but this becomes a terrible waste of memory if you have more than 3 objects and 3 verbs as this could read 9 "IF" statements. The routine used in the example game first splits a command into the first word and the remainder of the line at the first space found. Just for reasons of program speed the simple commonly used commands like LOOK & GO are checked for first. If the first word was not one of the first group of words checked for, then the second part of the object line is compared against the array of object descriptions, if a reasonable match is found then the subscript number of that description is used as an object number. In this case an object number of 0 means that no match was found and an appropriate message is printed. Next a similar routine is used to convert the first part of the command line to a verb number. The verb number is then used in an ON..GOTO if the verb number is such that this is just passed through then a message is printed. The ON..GO-



The Lightening Oric Assembler. £9.90*

There are other assembler/editors available for the ORIC but none combine the same features and ease of use that we have obtained with this comprehensive utility program for the ORIC 48K. The manual which accompanies the assembler gives a brief insight into machine code and the use of assemblers to enable anyone to write in assembly language after just a little study. Full specifications of the assembler cannot be fitted into the small space available here and so they may be obtained from your local dealer or direct from Mr. Micro.

*Includes comprehensive instructions booklet.

Crazy Golf £6.90
48K Spectrum

Crazy golf is a new program for the 48K Spectrum you are required to clear the course avoiding and circumventing the many strange obstacles finally putting your ball in the hole. The par for each hole is displayed and a novel direction indicator combined with a force indicator enable you to send the golf ball in the direction you feel is the best one to clear the course. Crazy golf really is crazy but most of all it is fun and will be found to be very enjoyable by all members of the family.

For use with Joystick and keyboard.

Bengo £6.90
Vic 20

An exciting program for the unexpanded Vic 20, which combines fast moving strategy and reflex skills. You must control Bengo the super Eskimo against the dreadful snow Yeti – Half blind and half witted the Yeti can smell a good Eskimo lunch – the only protection Bengo has is to hurl huge blocks of ice across the frozen waste at the Yeti.

– Don't get distracted – or you'll be personally responsible for the demise of an Eskimo!

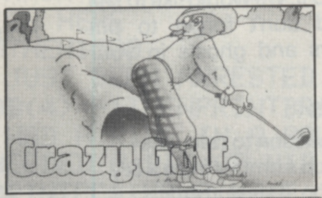
For use with Joystick.

Dracula £6.90
48K ORIC

A superb adventure for the 48K ORIC. This adventure is written in the good old style! No silly graphics, no gratuitous drawings, no distractions from pure mental images of horrendous realism. This evocative text adventure of the old genre will have Oric owners shivering with anticipation and perhaps fear.

Dare you load DRACULA into your ORIC 48 ?!!

By keyboard.



No shocks – Plenty of surprises!

Mr. Micro means programs you can trust. Programs that are as exciting when you load them as they look at your dealer. Programs that come proven and refined. Programs that bring you the breathtaking excitement of arcade games with the special extra dimension of real mental challenges – all at the right price. Plus accessories and utilities which extend the value of your computer. Ask for Mr. Micro by name at your local dealer. Or order your games direct, post-free, from: Mr. Micro Ltd. 69 Partington Lane, Swinton, Manchester M27 3AL. Cheques should be made payable to Mr. Micro Limited. Ring our 24 hour hot-line for payment by Access or Visa on: 061-728 2282.

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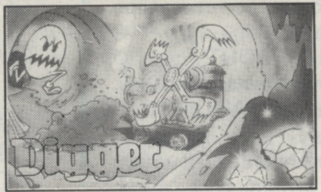
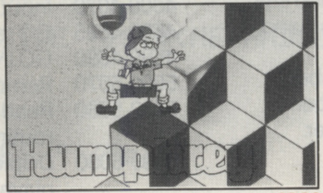




Mysterious Island

Amigo £6.90
Vic 20 8K or 16K expansion.

Hey Amigo you gotta run fast ah. The banditos they are a chasing you and they will a geta you ifa you do nota escapa OK. You musta runa rounda the blocka, when you run round de corners ofa de city the banditos they are frightened to go there and you score de points. Pity you have nota gota gun but a joystick can be fun.

For use with Joystick.

Digger £6.90
Vic 20 8K or 16K expansion

Your remote viewer shows the path of the professors devilish digging apparatus. Using your computer linked remote control you must guide the digger beneath the earth to collect the rare micronite gems. Unfortunately the micronite is protected by the micronits who will plague your machine in order to attempt to stop its progress. You may be able to kill the micronits by skillfully manoeuvering your digger beneath a subterranean stalactite which will then fall killing any micronit in its path. This is a novel implementation of a popular arcade game. For use with Joystick.

Humphrey £6.90
Vic 20 BBC Model B

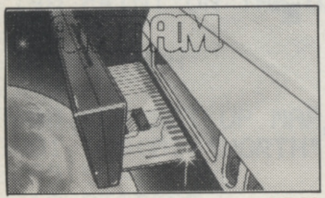
This new game for the BBC Model B or for the VIC 20 (8K or 16K expansion) and also for C.B.M. 64 involves some tricky decision taking. Object of game is to make Humphrey land on all the cubes thus changing their colour. Unfortunately Humphrey is being chased by a bouncing ATOMIC BOMB! You will soon learn that this deceptively simple game has tremendous addictive properties and quite a high degree of tactical skill.

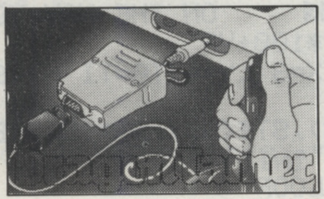
For use with keyboard or Joystick.

Mysterious Island £9.90
Vic 20 16K

Escape from prison in a hot air balloon – try to land it on Mysterious Island, then the fun really begins. ● Booby Trapped Fields ● Killer Bees ● Hostile Natives ● Hidden Clues ● Force Fields ● Capture the Nautilus ● Full Graphic Display ● Several Games lead to Exciting Climax ● Separate Practice Program ● Includes Blank Data Tape to store the game to play later.

All successful adventures can claim a unique personalised award by sending Mr. Micro their final position at the end of the game – By Joystick or keyboard.





RAMDAM £13.90
Vic 20

This accessory enables programs which would normally only work with 3K expansion to work with 8K or 16K expansion. RAMDAM saves having to buy a 3K pack if you already own an 8K or 16K. With RAMDAM and a Commodore 16K expansion all known tape games will run on your Vic 20. ● Includes Memory Test Program ● Free 6·5K game – MICROVADERS for use with Joysticks.

Punchy £6.90
Spectrum 484

Punch has taken Judy for his evil purposes and locked her away. Judy has called upon the forces of goodness to escape, so with the help of our hero Bobby the policeman and you the purchaser of this fine program you must guide brave Bobby across the stage to rescue poor Judy. Leap the gaps. Jump over the dogs. Leap the alligator pit. Dodge the tomatoes. Rock the crib. Collect the sausages and finally rescue Judy. By Kempstone joystick or keyboard.

Dragon Tamer £9.90
Dragon 32

Allows Atari type and other digital joysticks to be used with the Dragon – giving better response and more control. For the first time your Dragon will be able to reflect your true skills. ● Achieve higher games scores ● Less Frustration.

Plus To ensure maximum value, Dragon Tamer includes two original games for use with digital Joysticks.

Goldrush £6.90
Vic 20 3·5k

This graphic adventure program was the first in the world to offer real gold for the successful adventurer. An idea which has been much copied but never equalled. ● Fun ● Educational ● Challenging ● Clues ● Puzzles ● Searches ● Fast Reaction Game. For use with keyboard.

TO points to the routines to do each verb like GET & DROP things etc.

Program Description

The program is written in a series of short routines with one or two REMs in each just to describe the function of the routine. The lines just containing a "." are there to help debugging and to make the listing easier to follow, they generate a syntax error if execution of the program tries to follow an incorrect path due to a missing RETURN etc.

The last lines of the program are the data; streets, building, objects & verbs. The street data takes the format: street name, x and y positions of grid positions in MAP that it occupies. With negative numbers to end each item. The data for buildings has the same format. Objects-just have a description and a position number. Verbs are just stored as one word.

Main Variables

MAP(,)	Map of streets and buildings non zero value means you can stand there.
ST$( )	Street descriptions.
OB( )	Object positions.
OB$( )	Object descriptions.
L$	Command line.
C1$	First part of command line.
CS$	Second part of command line.
IT	Current object number.
SN	Current street number.
V	Current verb number.

Saving Memory

Some memory can be saved by replacing arrays like MAP and OB with a reserved area of memory, say, above basic and using peek & poke so OB(3)=5 would become POKE OB+3,5 etc but this is not worth doing unless you have a very large number of objects but it saves 4 bytes for each object with 250 objects that would be 1000 bytes.

If you decide to write a world beating adventure game, when you have finished it AND DEBUGGED it, we would like to see it. Have fun and don't forget to put dragons, monsters and ghosts in your games.

Main Routines

15	Def. function to calculate position number from x & y position. (D is dummy param.).
20-40	Init. constants and arrays.
50-100	Input command line, split it, test for verbs of first group.
200	Jump to main part of command interpreter.
900-950	Unrecognsided verb word.
1000-1050	Verb routines return to here checks after verbs finish restart main loop.
1500-1630	End game routines win or lose.
2000-2210	Look routine place description & objects present.
3000-3230	Main initialisation routine read data into arrays etc.
3500-3640	Find first space in command line.
3700-3720	Left justify J$.
4000-4070	Input & split command line.
4500-4595	GO routine.
4599-4690	GO IN & GO OUT.
5000-5070	Remove effects of shift key.
5499-5580	Read array MAP. Used by GO routine.
5999-6090	Display inventory of what player is holding.
6500-6580	Test to see if you have got the money to enter the Park.
6899-8940	On meeting people the result depends on if you are holding the gun.
7000-7095	Convert second part of input line to an object number and the first part to a verb number. Print a message if this unrecognised word is Jump to the routine to handle that verb number.
7100-7160	GET object routine. Make following checks: Have you already got it? Is the object here to be picked up? Is it the tramp? Is it the policewoman? Is it the shopping bag? Pick up object.
7200-7210	DROP object, first check if it is being held.
7300-7340	ASK somebody. Make following test: Is the object here? Is it the tramp or the policewoman? Otherwise you must be talking to an inanimate object.
7400-7420	CASH cheque: Was the second word CHEQUE? Is player holding one? Is player in the bank? Remove cheque from game. Give player money.
7500-7520	SHOOT object: Has he got a gun? Is the object present?
7900-7960	Try to find the last part of the command line in an object description. Used so that you only need to type "bag" or "shopping" when you want the shopping bag.
9000-9070	Random events: 93 in 100 chance of nothing happening. Is player holding the gun? Is the player indoors? Playing in front of a bus? You've been locked in.

```
1 REM ON THE WAY TO THE INTERVIEW
10 PRINT"▓▓▓▓▓▓▓▓      ON THE WAY TO THE INTERVIEW       ▀"
15 DEFFNPO(D)=XP*100+YP
20 MS=10:NS=31:LX=3:LY=4:T0=TI:NB=6:NV=5
25 XP=LX:YP=LY
30 DIM MAP(MS,MS),ST$(NS),DI$(5),OB(NB),OB$(NB),V$(NV)
40 GOSUB3000:REM INIT
45 REM-----MAIN LOOP
50 GOSUB2000:REM LOOK
60 GOSUB4000:REM INPUT
70 IFC1$="GO"THENGOTO4500
80 IFC1$="LOOK"THEN1000
```

```
90 IFC1$="QUIT"THENPRINT"I WOULD GO & PLAY SNAP":END
100 IFLEFT$(C1$,3)="INV"THEN6000
200 GOTO7000:REM VERBS + OBJECTS
900 IFC2$=""THENPRINTC1$;" ?";GOTO60
950 PRINT"I DO NOT KNOW HOW TO "C1$;" SOMETHING."
1000 REM VERBS FINISH HERE
1010 IFFNPO(0)=1000THEN1500
1015 BR$="YOU HAVE JUST BEEN ARRESTED FOR ATTEMPTED ARMED ROBBERY."
1020 IFSN=1049 ANDOB(4)=-1THENPRINTBR$:GOTO1600
1025 PC$="YOU JUST HAD A RIDE IN A POLICE CAR TO THE POLICE STATION."
1027 GE$="THE GUN NEEDED A BIT OF HIDING."
1040 IFSN=1050THENPRINTPC$:XP=0:YP=0:IFOB(4)=-1THENPRINTGE$
1045 GOSUB9000:REM NASTY RANDOM EVENTS
1050 GOTO50:REM-----REPEAT MAIN LOOP
1499 .
1500 T=(TI-T0)/3600
1505 PRINT"AND THERE AT THE END OF THE ROAD IS"
1506 PRINT"SLAVE DRIVER INTERNATIONAL."
1507 PRINT"WELL YOUR THERE."
1510 IFT<7THENPRINT"YOU MADE IT TO THE INTERVIEW ON TIME.":END
1520 IFT<10THENPRINT"BUT TO LATE.":END
1530 PRINT"BUT THEY HAVE ALL GONE HOME FOR THE NIGHT."
1540 END
1599 REM ---- BYE
1600 PRINT"WELL I DON'T THINK YOU ARE GOING TO GET TO THE INTERVIEW NOW."
1610 PRINT"I AM GIVING UP ON YOU AFTER ";INT((TI-T0)/3600);" MINUTES OF ";
1620 PRINT"MY VALUABLE TIME."
1630 END
1999 .
2000 REM LOOK ROUTINE
2010 F=0:HE=MAP(XP,YP)
2015 IFHE AND 1024THENPRINT"YOU ARE INSIDE ";ST$(HE AND1023);" ";:GOTO2075
2020 PRINT"YOU ARE ON ";ST$(HE);" ";
2030 FORI=0TO3
2040 C2$=DI$(I):GOSUB5500
2050 IFSN=HE AND F=0THENPRINT"WHICH GOES ";:F=1
2060 IFSN=HE THENPRINT" ";DI$(I);
2070 NEXT
2075 PRINT"."
2080 FORI=0TO3:C2$=DI$(I):GOSUB5500
2085 IFNOTNO AND SN<>HE THENPRINT"TO THE ";DI$(I);" IS ";ST$(SN AND1023)"."
2090 NEXT
2100 F=0:P=FNPO(0)
2110 FORI=1TONB
2120 IFOB(I)<>P THEN2200
2130 IFI<3THENPRINT"STANDING ON THE CORNER IS A ";OB$(I);".":GOTO2200
2140 PRINT"ON THE GROUND IS A ";OB$(I);"."
2200 NEXT
2210 RETURN
2999 .
3000 REM SET UP MAP ,DIRRECTIONS ETC
3001 DI$(0)="NORTH":DI$(1)="SOUTH":DI$(2)="EAST":DI$(3)="WEST"
3005 SN=1:SH=0
3010 RESTORE
3015 READS$
3020 GOSUB3500:REM READ STREET
3030 READS$:IFS$<>"*"ANDS$<>"$"THEN3020
```

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SOFTWARE

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```
3040 IFS$="$"THEN3080
3050 REM ### SHOP ETC. DATA
3060 SH=1
3070 GOTO3015
3075 REM READ OBJECTS
3080 FORI=1TONB
3090 READOB$(I),OB(I)
3100 NEXT
3199 REM READ NEW VERBS
3200 FORI=1TONV
3210 READV$(I)
3220 NEXT
3230 RETURN
3499 .
3500 ST$(SN)=S$
3510 READX,Y:IFX<0OR Y<0THENSN=SN+1:RETURN
3520 MAP(X,Y)=SN OR SH*1024
3530 GOTO3510
3599 .
3600 P=0:REM SEARCH FOR " " IN L$
3610 FORI=1TO LEN(L$)
3620 IFMID$(L$,I,1)=" "THENP=I:I=3000
3630 NEXT
3640 RETURN
3699 .
3700 IFJ$="" OR LEFT$(J$,1)<>" "THENRETURN
3710 J$=MID$(J$,2)
3720 GOTO3700
3999 .
4000 INPUT">  ▗▟██▌";L$
4010 IFL$=CHR$(191)ORL$=""THENPRINT"SILENT TYPE AH.":GOTO4000
4015 GOSUB5000
4020 SE$=" ":GOSUB3600:REM SEARCH FOR " "
4030 IFP=0THENC1$=L$:C2$="":RETURN
4040 C1$=LEFT$(L$,P-1)
4050 J$=MID$(L$,P+1)
4060 GOSUB3700:C2$=J$
4070 RETURN
4499 .
4500 IFC2$=""THENPRINT"OK BUT WHICH WAY?":GOTO1000
4505 IFC2$="IN"THEN4600
4507 IFC2$="OUT"THEN4650
4510 GOSUB5500
4570 IFNO THENPRINT"YOU CAN'T GO THAT WAY.":GOTO1000
4580 REM **** CODE FOR TESTING FOR OBSTRUCTIONS
4585 GOSUB6500
4590 IF NOT NO THENLX=XP:XP=X:LY=YP:YP=Y:GOTO1000
4595 GOTO1000
4598 .
4599 REM GO IN
4600 FORI=0TO3
4610 C2$=DI$(I):GOSUB5500
4620 IFSN AND 1024THENI=3000
4630 NEXT
4635 IFI<3000THENPRINT"IN WHAT ?":GOTO1000
4640 GOTO4570
```

```
4649 REM GO OUT
4650 IF0=(HE AND1024)THENPRINT"YOU ARE NOT IN.":GOTO1000
4655 FORI=0TO3
4660 C2$=DI$(I):GOSUB5500
4670 IF0=(SN AND 1024)ANDSN THENI=3000
4680 NEXT
4690 GOTO4570
4999 .
5000 O$="":REM REMOVE EFFECTS OF SHIFT KEY
5010 FORI=1 TO LEN(L$)
5020 Z=ASC(MID$(L$,I,1))
5030 Z=Z AND 127
5040 O$=O$+CHR$(Z)
5050 NEXT
5060 L$=O$
5070 RETURN
5498 .
5499 REM READ MAP AROUND XP,YP
5500 X=XP:Y=YP:SN=0
5505 C3$=LEFT$(C2$,1)
5510 IFC3$="N"THENY=Y-1
5520 IFC3$="S"THENY=Y+1
5530 IFC3$="E"THENX=X+1
5540 IFC3$="W"THENX=X-1
5545 IFX+Y=XP+YPTHENPRINT"I WISH YOU WOULD GO ";C2$" !"
5550 NO=X>10 OR X<0 OR Y<0 OR Y>10
5560 IFNOTNO THENNO=NO OR MAP(X,Y)=0
5570 IFNOTNO THEN SN=MAP(X,Y)
5580 RETURN
5998 .
5999 REM INVENTORY
6000 F=0:PRINT"YOU ARE HOLDING :";
6010 FORI=1TONB
6020 IFOB(I)<>-1THEN6050
6030 F=F OR 3454
6040 PRINT" ";OB$(I);
6050 NEXT
6070 IFF=0THEN PRINT"▮NOT A LOT";
6080 PRINT"."
6090 GOTO1000
6498 .
6499 REM OBSTRUCTIONS
6500 IFSN<>13THENRETURN
6510 IFOB(6)=-1AND HE<>13THENPRINT"IT COST YOU A BIT TO GET IN HERE.":RETURN
6520 IFOB(6)=-1THENRETURN
6550 NO=-1
6560 PRINT"SORRY IT COSTS MONEY TO ENTER THE PARK."
6570 IFOB(5)=-1THENPRINT"AND WE DO NOT EXCEPT CHEQUES."
6580 RETURN
6898 .
6899 REM PEOPLE TROUBLE
6900 IFOB(4)=-1THENPRINT"THE TRAMP JUST RAN AWAY.":OB(2)=-2
6910 PRINT"YOU JUST HAD A BAD EXPIENCE WITH A TRAMP.":GOTO1600
6920 IFOB(4)<>-1THENPRINT"WHY SHOULD SHE KNOW.":GOTO1000
6930 PRINT"SHE JUST LOCKED YOU UP FOR BEING IN POSSESSION OF";
6940 PRINT" A DEADLY WEPON.":GOTO1600
```

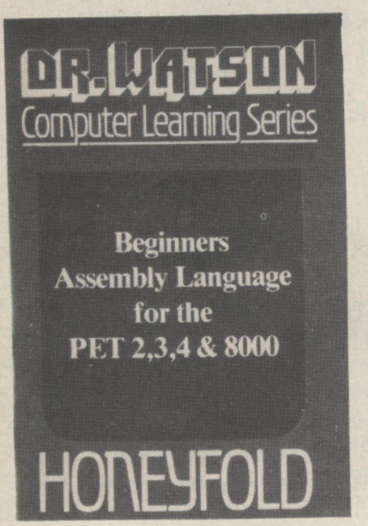
```
6998 .
6999 REM VERBS RELATED TO OBJECTS
7000 IFC2$=""THEN900
7005 REM FIND OBJECT NUMBER
7010 IT=0:FORJ=1 TONB
7020 C$=OB$(J):GOSUB7900
7030 IFFO THEN IT=J:J=3000
7040 NEXT
7050 IFIT=0THENPRINT"WHATS A ";C2$;"?":GOTO1000
7055 V=0:REM FIND VERB NUMBER
7060 FORI=1TONV
7070 IFC1$=V$(I)THENV=I:I=3000
7080 NEXT
7090 ON V GOTO 7100,7200,7300,7400,7500:REM VERB ROUTINES
7095 GOTO900:REM NOT KNOW
7098 .
7099 REM *GET*
7100 IFOB(IT)=-1THENPRINT"YOU ARE ALREADY HOLDING IT.":GOTO1000
7110 IFOB(IT)<>FNPO(0)THENPRINT"I CAN'T SEE A ";OB$(IT);".":GOTO1000
7120 IFIT=2 THEN6900
7130 IFIT=1THENPRINT"NO. I THINK SHE IS A BIT OLD FOR YOU.":GOTO1000
7140 IFIT=3THENPRINT"◘  B A N G ! ■ PARCEL BOMB AH!":GOTO1600
7150 OB(IT)=-1
7160 GOTO1000
7198 .
7199 REM *DROP*
7200 IFOB(IT)<>-1THENPRINT"YOU ARE NOT HOLDING A ";OB$(IT);".":GOTO1000
7210 OB(IT)=FNPO(0):GOTO1000
7298 .
7299 REM *ASK*
7300 IFOB(IT)<>FNPO(0)THENPRINT"WHAT ";OB$(IT);"?":GOTO1000
7310 IFIT=2THEN6900
7320 IFIT=1THEN6920
7330 PRINT"DO YOU ALWAYS TALK TO ";OB$(IT);"?"
7340 GOTO1000
7398 .
7399 REM *CASH*
7400 IFIT<>5THENPRINT"I'LL CASH YOU IN A MINUTE.":GOTO1000
7402 IFOB(5)<>-1THENPRINT"CASH WHAT CHEQUE ?":GOTO1000
7405 IFFNPO(0)<>308THENPRINT"I THINK YOU NEED A BANK.":GOTO1000
7410 OB(5)=-2:OB(6)=-1
7420 PRINT"OK. BUT THE CHEQUE WAS NOT FOR MUCH.":GOTO1000
7498 .
7499 REM *SHOOT*
7500 IFOB(4)<>-1THENPRINT"I CAN'T SHOOT ANYTHING WITH MY FINGER.":GOTO1000
7510 IFOB(IT)<>FNPO(0)THENPRINT"SORRY I CAN'T SEE ONE.":GOTO1000
7520 PRINT"I'M NOT HAVING ANYTHING TO DO WITH YOU SHOOTING THINGS.":GOTO1600
7899 .
7900 FO=-1:REM SEARCH FOR WORDS IN A STRING
7910 IFLEFT$(C$,LEN(C2$))=C2$THENRETURN
7920 L$=C$:SE$=" ":GOSUB3600
7930 IFP=0THENFO=0:RETURN
7940 L$=MID$(L$,P+1)
7950 IFLEFT$(L$,LEN(C2$))=C2$THENRETURN
7960 GOSUB3600:GOTO7930
8998 .
8999 REM RANDOM EVENTS
```

COMPLETE

BEGINNERS 6502/6510 COURSE

IN

ASSEMBLY LANGUAGE PROGRAMMING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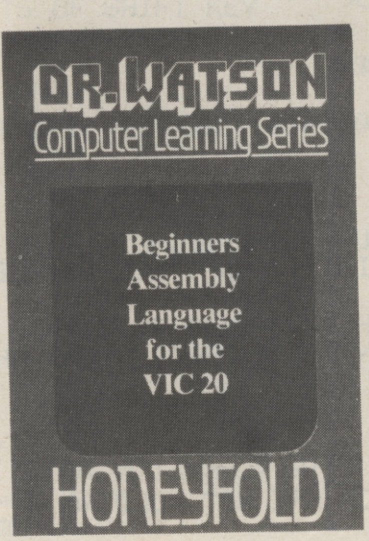
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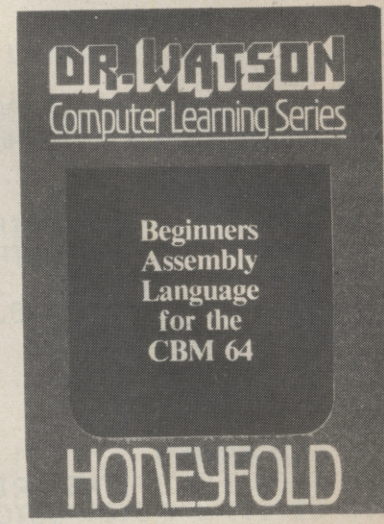
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```
9010 IFOB(4)=-1THENPRINT"▒BANG■  THAT MADE YOUR EYES WATER.
9020 IFOB(4)=-1THENPRINT"YOU SHOULD NOT HAVE PUT THAT GUN IN THE FRONT OF
YOUR BELT."
9030 IFOB(4)=-1THEN1600
9035 IFHE AND1024THEN9070
9040 IFRND(1)>.7THENPRINT"▒SPLAT !■ YOU ARE UNDER A NUMBER 9 BUS":GOTO1600
9050 PRINT"THAT NUMBER ";INT(RND(1)*404);" BUS NEARLY HIT YOU."
9060 RETURN
9070 PRINT"THEY HAVE ALL GONE HOME & LOCKED YOU IN.":GOTO1600
9999 REM ROAD POSITION DATA
10000 DATA ROUND STREET,0,1,1,1,2,1,0,2,0,3
10010 DATA 1,3,2,3,2,2,-1,-1
10020 DATA END STREET,2,0,-1,-1
10030 DATA FRED'S LANE,3,1,-1,-1
10040 DATA STATION ROAD,4,0,4,1,4,2,4,3,4,4,4,5
10050 DATA 4,6,4,7,-1,-1
10060 DATA END ROAD,1,4,1,5,-1,-1
10070 DATA CROOCK STREET,0,5,0,6,0,7,1,7,1,8
10075 DATA-1,-1
10080 DATA THE WAY,2,6,3,6,-1,-1
10090 DATA PRINCE ROAD,5,4,-1,-1
10100 DATA SHORT CUT CLOASE,6,4,6,5,6,6,-1,-1
10110 DATA RETURN ROAD,5,6,-1,-1
10120 DATA HOME STREET,0,9,1,9,2,9,3,9,4,9,6,9
10130 DATA 5,9,-1,-1
10140 DATA LATE STREET,6,8,7,8,-1,-1
10150 DATA A PRIVATE PARK,8,5,8,6,8,7,8,8,9,6,9,7,-1,-1
10160 DATA SOMEONE'S DRIVE WAY,9,9,-1,-1
10170 DATA INNER VIEW LANE,10,7,10,8,10,9,-1,-1
10180 DATA COMMODORE STREET,8,4,9,4,10,4,-1,-1
10190 DATA SHORT STREET,9,3,-1,-1
10200 DATA LOST MANS ROAD,6,2,7,2,8,2,9,2,-1,-1
10210 DATA STATION ROAD,9,1,10,1,-1,-1
10220 DATA THE GOOD WAY,6,1,-1,-1
10230 DATA THE PLACE,6,0,7,0,8,0,-1,-1
10240 DATA DEAD MANS DRIVE,10,0,-1,-1
10250 DATA "*"
10255 REM PLACE DATA
10260 DATA A POLICE STATION,0,0,-1,-1
10270 DATA A TUBE STATION,3,4,-1,-1
10280 DATA A BANK,3,8,-1,-1
10290 DATA A PRIVATE HOUSE,1,10,-1,-1
10300 DATA A DARK TUNNEL UNDER THE RAILWAY
10310 DATA 6,10,7,10,8,10,9,10,-1,-1
10320 DATA S D INTERNATIONAL,7,3,-1,-1
10330 DATA FRED'S TEA SHOP,10,5,-1,-1
10340 DATA "$"
10345 REM OBJECT DATA
10350 DATA POLICE WOMAN,509
10360 DATA TRAMP,103
10370 DATA SHOPPING BAG,402
10380 DATA GUN,7
10390 DATA CHEQUE,-1
10400 DATA MONEY,-2
10500 REM VERBS
10510 DATA GET,DROP,ASK,CASH
10520 DATA SHOOT
READY.
```

AaBbCcDdEeFfGgHhIiJjKkLlMmNn

ABC
BY COMPUTER

Most CAL programs have had to assume that the learner will be able to use a key-board and read information presented on the screen. This means that CAL has remained unavailable to many of those who might most benefit from it, e.g., young children and those older children and adults who have learning problems. The imminent launch of the CBM speech unit means that a cheap microcomputer can now 'talk' to the learner and thus facilitate the production of effective CAL programs to meet the needs of these groups. The first generation of these programs has been produced for CBM by a new software partnership called EDATA. The EDATA team comprise a Professional Programmer, a Systems Analyst, a Primary School Headmaster and an Educational Psychologist, a pretty high-powered team assembled to write educational software. Their first programs, to be launched simultaneously with the CBM speech unit will assist in the teaching of early reading instruction.

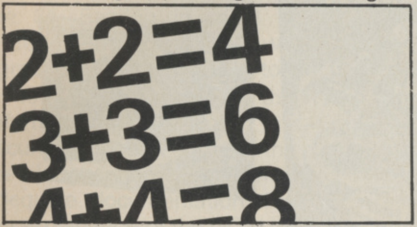
The programs were previewed at the CBM show this year and were enthusiastically received by parents and teachers. The programs effectively take over an important part of reading instruction that is very difficult to provide in schools. There are a variety of ways of teaching early reading skills but, no matter which method is preferred by a particular school or teacher, at some stage the learner is required to sit reading aloud whilst an 'expert reader' monitors their performance. The job of the expert is to supply some form of prompt when the learner is 'stuck'. A moments reflection will illustrate why schools find it so difficult to provide this essential element in reading instruction for all their pupils on a frequent and regular basis. This kind of help is very expensive because it is one-to-one teaching at its most intensive. Try it yourself for a few minutes with a child just learning to read. You will quickly discover that although the task is not complex following the child's reading will demand your full and undivided attention. The task becomes even more difficult if there are 29 other children in the same room all clamouring for attention. This, however, is a small part of the total problem because the logistics of listening to children read is very demanding of the teachers time. For example, assume that a beginning reader needs to be listened to for say 5 minutes each day.

The cat sa
on th

If there are 30 children in a class this will require 2 hours 30 minutes which, in many infants schools, represents a whole mornings work. Even if every morning were spent doing this, each pupil would spend 2 hours 25 minutes of the 2 hours 30 minutes without contact with the teacher. The problem is magnified by the fact that the 29 children who, at any one time, are NOT with the teacher are unlikely to be clones of the beautifully behaved children that smile out of family photograph albums. In addition, and contrary to popular belief, teachers of infants tend to be mere mortals and the task of endlessly following grubby little fingers across innumerable pages does not always provide the ultimate in job satisfaction.

AaBbCcDdEeFfGgHhIiJjKkLlMmN

The EDATA team have made imaginative use of the CBM speech unit and the colour graphics of the 64k to produce 10 programs that take over this element of reading instruction in an effective and interesting way. The operating characteristics of the programs can be described in a few sentences. When one of the CAL programs is run the first page of a beginning reader appears on the screen complete with picture and text. A line appears under the first word of the text and the reader can advance this line along the text by pressing one of the function keys. Every time they press the key the line moves to the next word (just like reading by pointing with the finger).



Whenever the reader comes to a word they cannot read then simply pressing the space bar will cause the speech unit to 'say' that word. Whichever word is currently underlined will be spoken when the space bar is depressed. The voice, in contrast to many speech units, is not robotic but is a friendly female voice. The space bar and two function keys (one to advance the line and one to move it backwards) are the only controls the learner needs to use. EDATA have a philosophy that the microcomputer should never get in the way of the learning process. They work on the principle that if it takes longer than 3 or 4 sentences to explain the mechanics of using a CAL program to a child then the program is deficient.

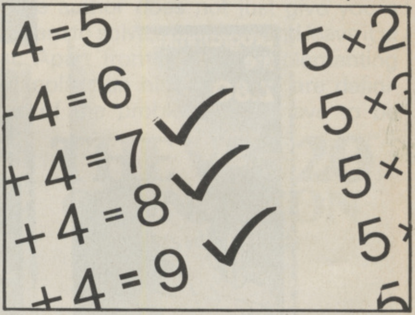
The above explanation does not do justice to the way these programs have been put together. The 10 books are made up of two sets of 5 related stories. The graphics are all in full colour and the characters in the stories are animated. At the start of each page these characters perform actions that are related to the text on each page giving the child essential cues as to the meanings of the text. There are a number of charming characters in the stories but two of the main characters, Tom (a small boy) and Mr. Bits (a robot) are excellent examples of the realism that can be attained using sprites. EDATA claim that no other small microcomputer can compete with the 64k for moving colour graphics and it also SPEAKS.

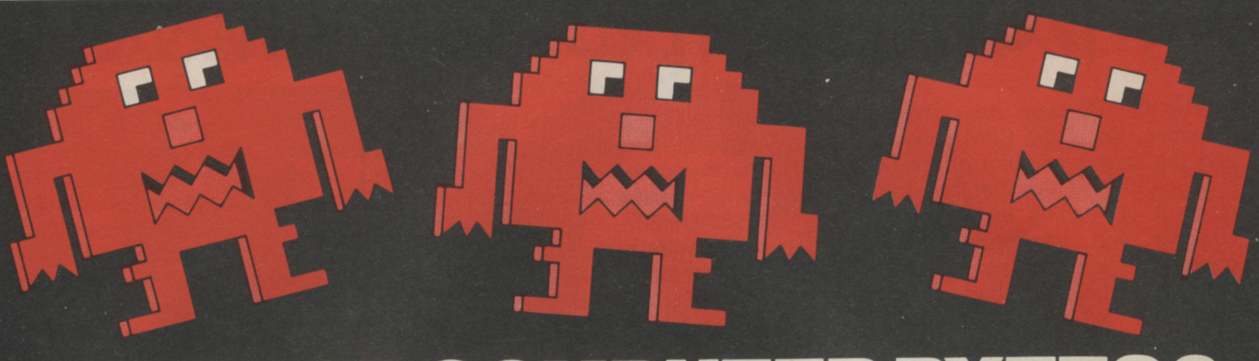
According to the Educational Psychologist on the EDATA team this mode of learning is very useful both for those who are learning to read at an early age and for those who have reading problems, i.e., dyslexics and adult illiterates. Many children and adults who have reading problems feel very uncomfortable and anxious when having reading instruction because, no matter how sympathetic the teacher, the learner is always conscious that they are making mistakes, in the presence of another person, on a task which is apparently very simple for everybody else. The anxiety they feel in these circumstances lowers their self-esteem and hinders their learning. Poor readers have no anxiety about asking a microcomputer for help.

A lot of thought and care has gone into the production of these Talking Books even to the extent that they can automatically determine whether they are being run on a British or an American machine and alter the spelling appropriately. They will undoubtedly make a big impact on the use of microcomputers with young children both in the home and at school. EDATA are planning books with different 'interest ages' to provide for a wide range of children and adults as well as programs for spelling and mathematics.

The quick
rown fox
umped o

The programs were devised by the EDATA team's Primary School Headmaster and the Educational Psychologist. The books were written using a limited vocabulary suitable for beginning readers. A number of the books also teach other concepts in addition to helping with learning to read, i.e., separate books teach shapes, colours, relative sizes, simple counting etc. The programs are intended for use in the home or at school. The idea is that the child is given a book to read in the form of the CAL program. Each book will be on a cartridge which simply plugs into the speech unit and runs without the usual load/run commands. Many CAL programmers erroneously believe that child/novices find loading and running programs easy because they have seen a few very bright children (often their own children) cope with this. To operate EDATA programs neither teacher nor child need have any computer knowledge. The child simply plugs in the cartridge, switches on the microcomputer and the program automatically loads and runs. The learner works through the book asking for prompts whenever required. When the reader feels confident they know all the words in the book, he/she returns to the teacher and demonstrates their skill by reading the book to the teacher. The EDATA team say that the programs are not intended as a substitute for the teacher but are aimed at making teaching more effective by providing a one-to-one teaching situation whilst at the same time freeing the teacher to deal with other problems. The programs are designed to patiently and accurately provide the learner with an immediate prompt at the moment the learner requires it. In addition the EDATA programs also record each word the child asks for help with and the number of pages read. This list can be obtained by the teacher at the end of each session, either as a printout or on the screen and can be used for diagnostic purposes. It is a facility that has impressed many teachers because the learners activities are being monitored for the entire time they are using the programs. These records are obtained by pressing a single key, simplicity is an overriding element in EDATA programs.





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programming the Z.80
PROGRAMMING THE Z80
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SYBEX
Your First BASIC PROGRAM
Rodnay Zaks
Programming the 6502
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THE EASY GUIDE TO YOUR COMMODORE 64
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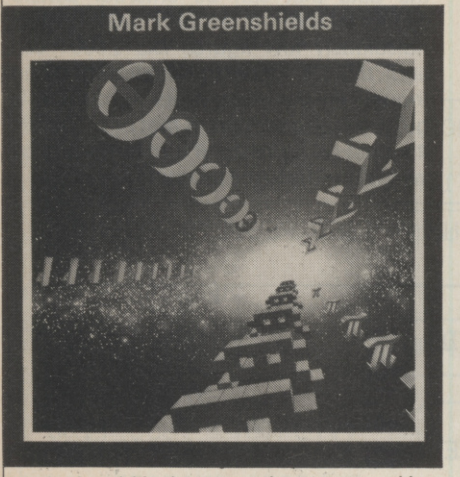
Mastering the Commodore 64

This book is the first piece of literature to be produced by Mark Greenshields and he has been helped by Tim Hartnell, the author of 'Getting Acquainted With Your VIC 20'. Tim believes that 'Mastering The Commodore 64' is the book that provides the key to unlock the exciting potential of the 64. Bearing in mind that this is Greenshield's first book, I would like to agree with him. I would like to, but I won't.

To be fair, most of the technical information contained in the book is accurate although some of the examples are longwinded, confusing and lack adequate documentation. For instance, the explanation of the GOSUB command leaves something to be desired. Apart from an example program that illustrates the subroutine, there is little explanation of the function of the command. All the reader is told is that once the command is used, you go outside the program and have to RETURN to it. Most inquisitive people trying to master the 64 might like to know how the outside routine is performed as well as why. A little more documentation required please.



So after having given some basic documentation on the BASIC language, how does the rest of the book fare? The section on colour on the 64 owes most of its credibility to the colour codes table and most of its discredit to some rather confusing examples. Take a look at this; POKE 53281,2 AND 15 for a red screen. The AND 15 is supposed to filter out excess numbers and give a true colour. It is also useful for a bit of time wasting, because if you have already POKEd the correct colour there is no need to filter out excess numbers. You can only get out what you put in. This is a very short section as are many of the ensuing sections. Animation is dealt with in a mere five pages and one of the ways of producing animation in BASIC is not even bothered with. At least the chapter on sprites is given a fair chance to prove itself. Sprites are probably the most useful and effective of the 64's graphic capabilities and this chapter is one of the best in the book.

Despite the full memory map and telling you how to correct errors in the BASIC and KERNAL ROMs, this book tends to skip through the capabilities of the 64. If I had read this book before buying a 64, I would think the 64's possibilities were pretty limited, and that this book as a key to the 64's capabilities has got stuck in the lock.

Title:	*Mastering The Commodore 64*
Author:	*Mark Greenshields*
Publisher:	*Interface Publications*
Address:	*44/46 Earls Court Road, London W8 6EJ*

The Vic 20 Connection

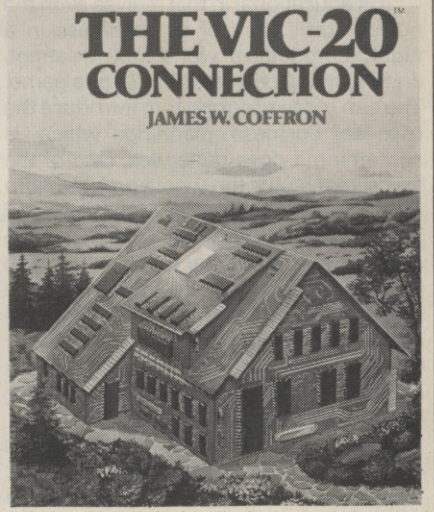
This book is so new that at the time of going to press there were no copies on general sale and no retail price had been fixed. Hopefully by the time you have read this, this will have been sorted out. The sole UK distributor to bookshops and computer stores is The Computer Bookshop.

This book is aimed at those people who have recently bought, or are thinking of buying, a VIC 20 and would like many multitudes of questions answering.

The author assumes that the user of the system is familiar with BASIC in that they should be able to write simple software. Given this as so, the user should also be acquainted with basic computing terms like CPU, peripherals, transducer, and so the new vocabulary pages are a bit pointless.

What happens after this is a brief, but quite useful, outline of software for output. This covers the use of the CMS I/O board and the instruction POKE.

The author does not just give you a program to solve a problem and leave it at that. Apart from actually implementing the application himself, there are definitions of the problems that have to be overcome and detailed explanations of the hardware and software concepts necessary to put the system into action. However, the problems put forward in the book can only be used as a general idea of how to implement the system in your own environment. This is a well documented book with either photographs, diagrams or programs on practically all of the 268 pages. The reader will also find that the book is very well equipped as far as appendices are concerned. So, in conclusion, for all those people who want to do things like open and close windows, control the temperature and feed the cat by remote control, this book should not be passed over lightly.



Title:	*The VIC 20 Connection*
Price:	*To be announced*
Author:	*James W. Coffron*
Publisher:	*Sybex*
Sole UK Distributor:	*The Computer Bookshop*
Address:	*30 Lincoln Road, Olton, Birmingham B27 6PA*
Tel:	*021 707 7544*

SOFTWARE REVIEW

CORPLAN

Many business ventures have always been a bit of a gamble especially if the entrepeneur is not quite sure of the size of the market – or even if one exists! – that he is going to supply. For those who have gained wisdom by experience, the chances of financial disaster are less likely to happen but for all those that are new to the game, the risks are high and serious. As in many cases before, the 8032 computer has come to their help via a company called Understanding Limited.

They describe their product, called Corplan, as something between an educational game and a piece of software exclusively for business and at first it is difficult to decide whether it is a piece of educational software or solely for business.

It is educational in that it gives even the novice some idea of big business in a highly competitive world. Yet it cannot, and must not, be treated solely as a game. The aim of the program is to introduce the user to business planning, which is something it does quite well. One of the first screens puts the whole program into focus: you can be brave or foolhardy and jump straight into decisions, or be cautious and probe the markets first. The latter is probably the best idea, because on numerous occasions I jumped into the decisions and found myself bankrupt after three or four seconds, each time for a different reason like insufficient cash or not enough salesmen.

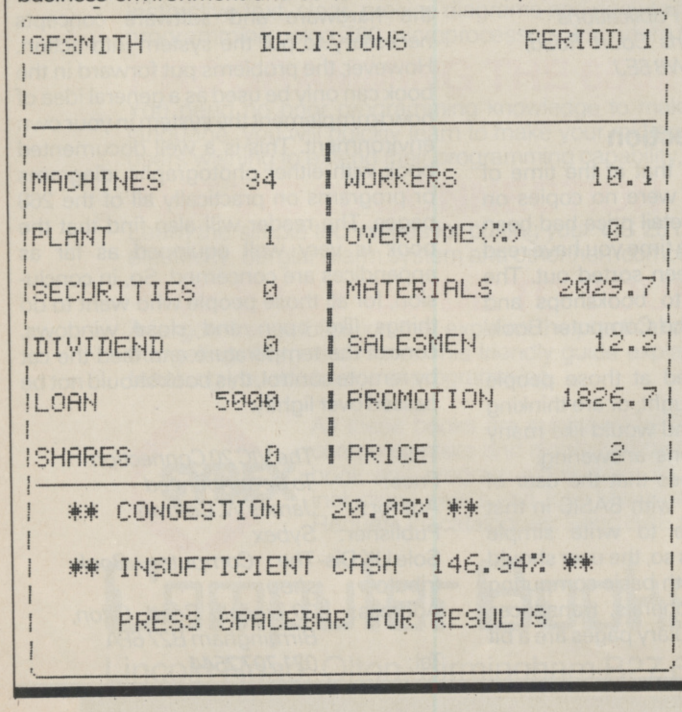
This program can be operated by just one person who takes all the decisions, but this situation arises very rarely in a business environment and so to make it more realistic to those in business, it is recommended and designed to be used by more than one user at a time. If there is more than one user, this means that tasks may be divided between the sales, production and financial directors, with the managing director as the overseer. The roles of these, and the decisions they make, are made clear in the accomanying manual.

The manual itself is, on first reading, a little more difficult to follow than that which accompanies the everyday product. It does not say press A and then SHIFT Y to gain the answer to C. It is far more a case of being educated by example, trial and error.

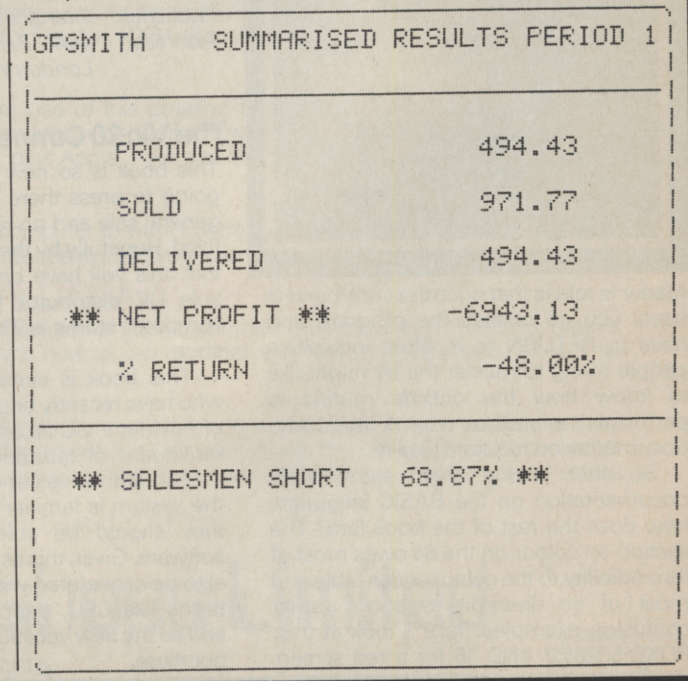
The first screen to appear enables you to enter the name of the company and whether or not you want the title printed out or not. In this case, all printed matter came from the 3022 tractor printer. Whether or not you have a printer is optional you do not need one to work the system. However, if you do not have one, you are obviously losing out as regards to the performance of the system. On the main menu, there are eight options which can be jumped into, most of which can be printed. These options cover practically all the aspects of production and finance, although the finance section is not an account in the sense of a daily purchase ledger, but is used mainly in the preparation of quarterly and annual reports.

It is also the responsibility of the financial director to make stock market decisions. The obvious aim of the company would be to maximise profits and this can be done over the short term quarter to quarter period or long term over several quarters. The points to remember here, as advised by the manufacturers, is to build up profits steadily and to advertise. The success rate of the company cannot, however, be judged by its performance in the first quarter but by the return on assets which appears in the summarised results as a percentage figure.

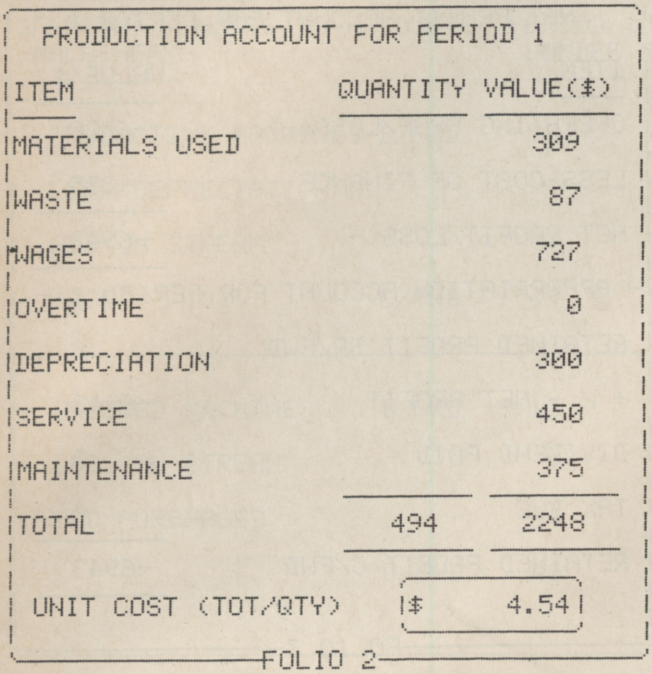
One of the flaws with this type of product is that there is a tendency to take the whole project and its results very lightly, mainly because it is an example of what may happen in the business world. The other flaw is that in some cases, as in determining the selling price of the product, there is little or no limitation to the data that can be entered. Letters cannot be entered, but (as in selling price) ridiculously low figures like 0.0001 can and this is perfectly legitimate even though no company in its right mind is going to sell a product at that price. Surely it would be far better if a minimum price was entered into the program?



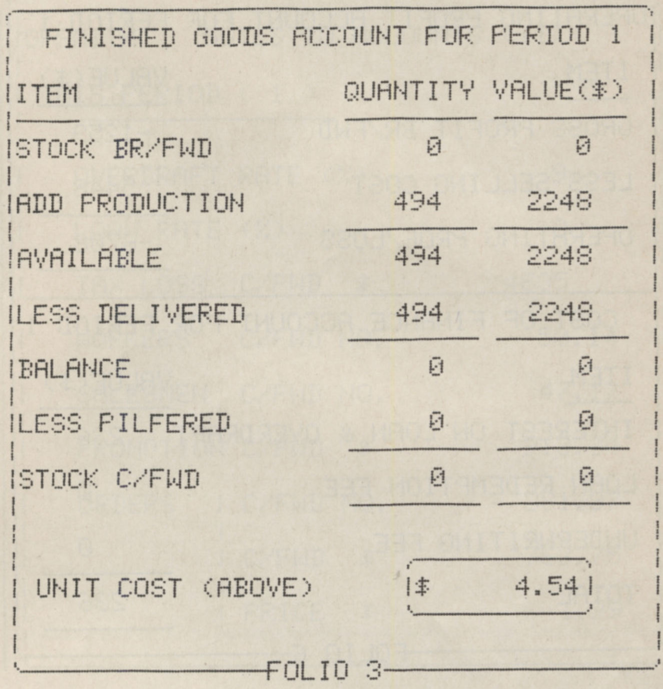
```
GFSMITH        DECISIONS          PERIOD 1
-----------------------------------------
MACHINES     34  WORKERS          10.1
PLANT         1  OVERTIME(%)         0
SECURITIES    0  MATERIALS      2029.7
DIVIDEND      0  SALESMEN         12.2
LOAN       5000  PROMOTION      1826.7
SHARES        0  PRICE               2
-----------------------------------------
 ** CONGESTION    20.08% **

 ** INSUFFICIENT CASH  146.34% **

    PRESS SPACEBAR FOR RESULTS
```



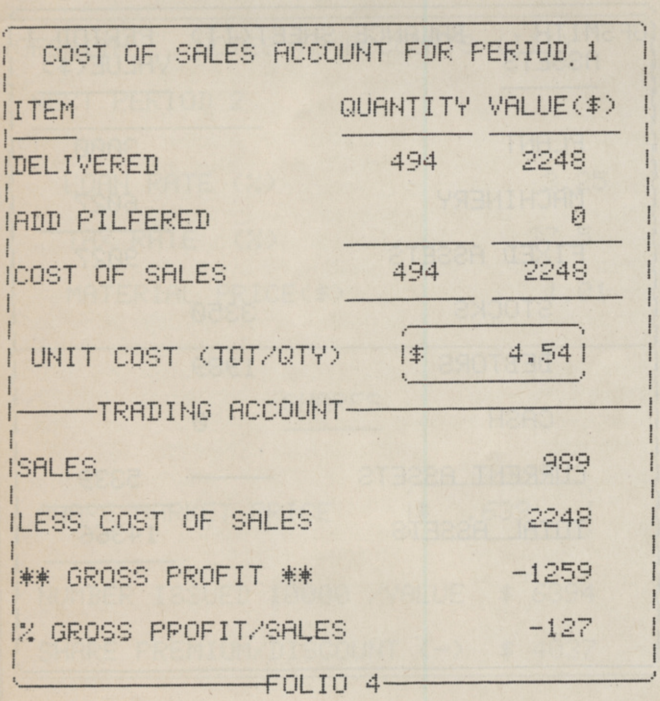
```
GFSMITH    SUMMARISED RESULTS PERIOD 1
-----------------------------------------

   PRODUCED                   494.43

   SOLD                       971.77

   DELIVERED                  494.43

 ** NET PROFIT **           -6943.13

   % RETURN                  -48.00%
-----------------------------------------

 ** SALESMEN SHORT    68.87% **
```



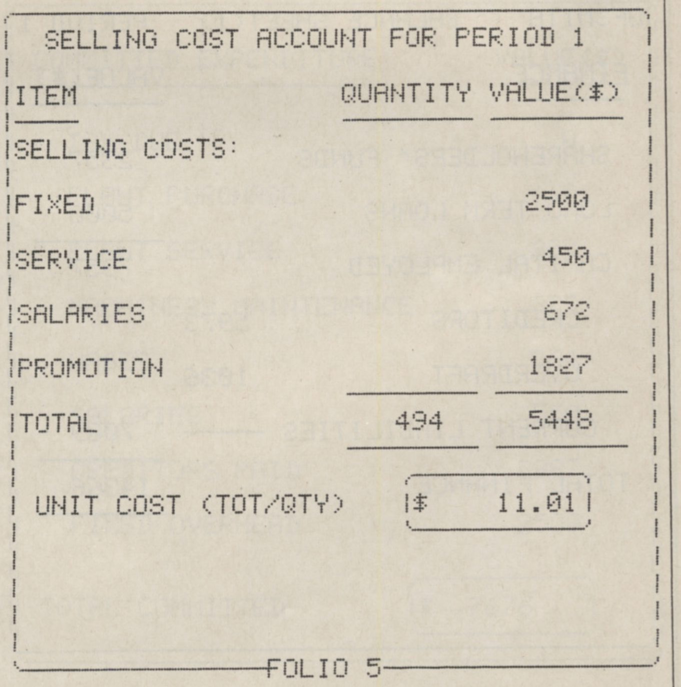
```
| PRODUCTION ACCOUNT FOR PERIOD 1           |
|                                           |
|ITEM               QUANTITY  VALUE($)      |
|----               --------  --------      |
|MATERIALS USED                   309       |
|                                           |
|WASTE                             87       |
|                                           |
|WAGES                            727       |
|                                           |
|OVERTIME                           0       |
|                                           |
|DEPRECIATION                     300       |
|                                           |
|SERVICE                          450       |
|                                           |
|MAINTENANCE                      375       |
|                   --------  --------      |
|TOTAL                  494      2248       |
|                   --------  --------      |
|                                           |
| UNIT COST (TOT/QTY)   |$        4.54|     |
|                                           |
----------------FOLIO 2----------------------
```



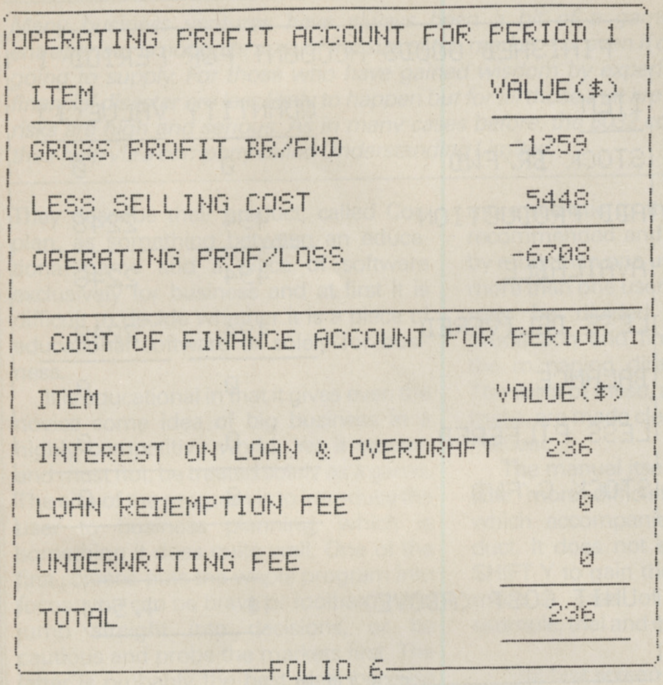
```
| FINISHED GOODS ACCOUNT FOR PERIOD 1       |
|                                           |
|ITEM               QUANTITY  VALUE($)      |
|----               --------  --------      |
|STOCK BR/FWD             0         0       |
|                                           |
|ADD PRODUCTION         494      2248       |
|                   --------  --------      |
|AVAILABLE              494      2248       |
|                                           |
|LESS DELIVERED         494      2248       |
|                   --------  --------      |
|BALANCE                  0         0       |
|                                           |
|LESS PILFERED            0         0       |
|                   --------  --------      |
|STOCK C/FWD              0         0       |
|                   --------  --------      |
|                                           |
|                                           |
| UNIT COST (ABOVE)     |$        4.54|     |
|                                           |
|                                           |
----------------FOLIO 3----------------------
```



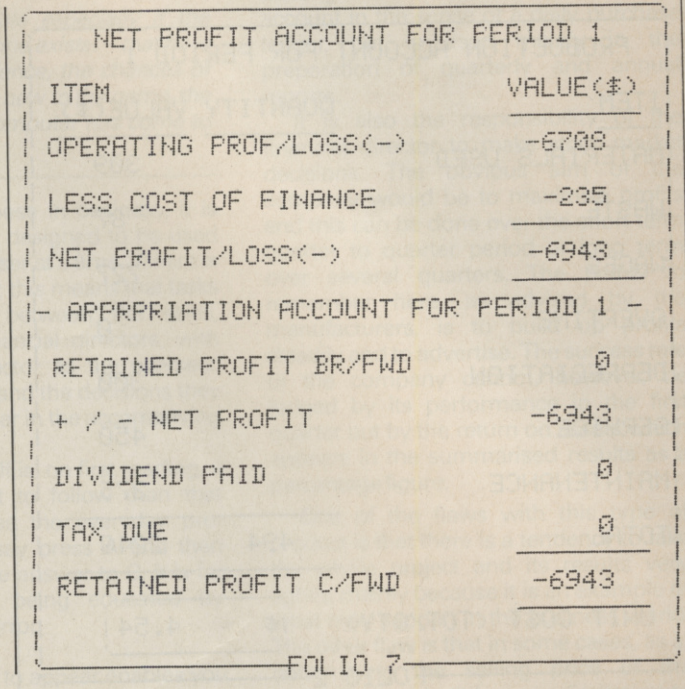
```
| COST OF SALES ACCOUNT FOR PERIOD 1        |
|                                           |
|ITEM               QUANTITY  VALUE($)      |
|----               --------  --------      |
|DELIVERED              494      2248       |
|                                           |
|ADD PILFERED                       0       |
|                   --------  --------      |
|COST OF SALES          494      2248       |
|                   --------  --------      |
|                                           |
| UNIT COST (TOT/QTY)   |$        4.54|     |
|                                           |
|---------TRADING ACCOUNT-------------------|
|                                           |
|SALES                            989       |
|                                           |
|LESS COST OF SALES              2248       |
|                                           |
|** GROSS PROFIT **             -1259       |
|                                           |
|% GROSS PROFIT/SALES            -127       |
|                                           |
----------------FOLIO 4----------------------
```



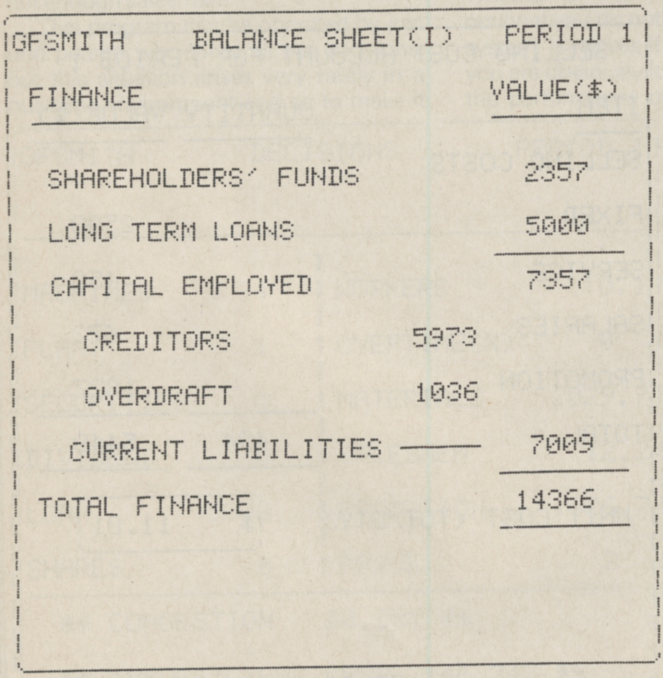
```
| SELLING COST ACCOUNT FOR PERIOD 1         |
|                                           |
|ITEM               QUANTITY  VALUE($)      |
|----               --------  --------      |
|SELLING COSTS:                             |
|                                           |
|FIXED                           2500       |
|                                           |
|SERVICE                          450       |
|                                           |
|SALARIES                         672       |
|                                           |
|PROMOTION                       1827       |
|                   --------  --------      |
|TOTAL                  494      5448       |
|                   --------  --------      |
|                                           |
| UNIT COST (TOT/QTY)   |$       11.01|     |
|                                           |
|                                           |
|                                           |
|                                           |
----------------FOLIO 5----------------------
```



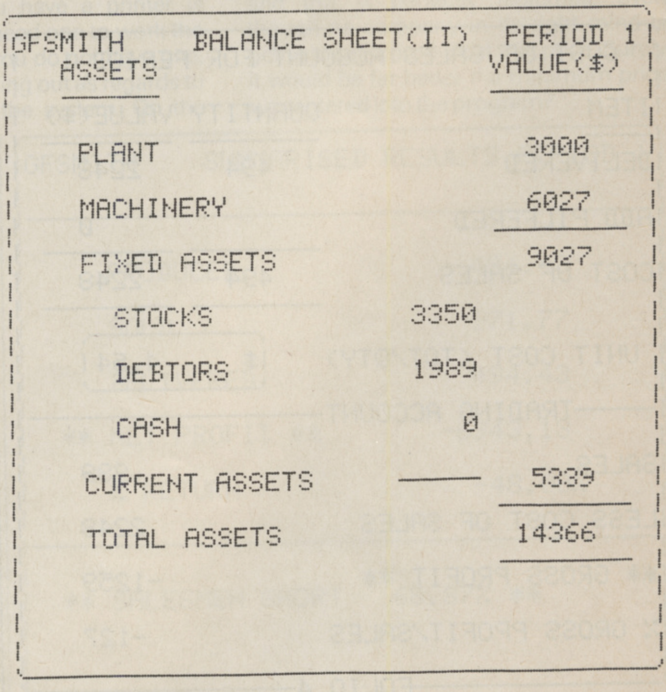
```
OPERATING PROFIT ACCOUNT FOR PERIOD 1

 ITEM                          VALUE($)
 ----                          --------
 GROSS PROFIT BR/FWD             -1259

 LESS SELLING COST                5448
                               --------
 OPERATING PROF/LOSS             -6708
                               --------

  COST OF FINANCE ACCOUNT FOR PERIOD 1

 ITEM                          VALUE($)
 ----                          --------
 INTEREST ON LOAN & OVERDRAFT   236

 LOAN REDEMPTION FEE              0

 UNDERWRITING FEE                 0
                               --------
 TOTAL                          236
                               --------
                  FOLIO 6
```



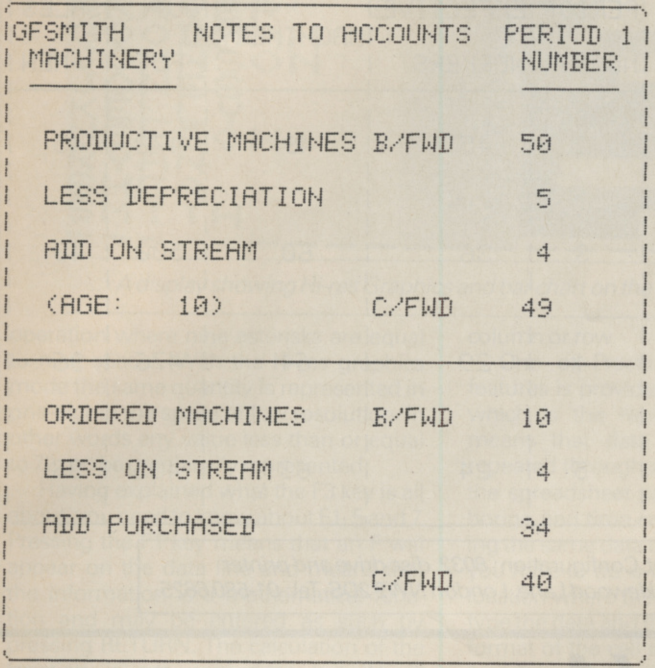
```
    NET PROFIT ACCOUNT FOR PERIOD 1

 ITEM                           VALUE($)
 ----                           --------
 OPERATING PROF/LOSS(-)           -6708

 LESS COST OF FINANCE              -235
                                --------
 NET PROFIT/LOSS(-)               -6943
                                --------
- APPRPRIATION ACCOUNT FOR PERIOD 1 -

 RETAINED PROFIT BR/FWD               0

 + / - NET PROFIT                 -6943

 DIVIDEND PAID                        0

 TAX DUE                              0
                                --------
 RETAINED PROFIT C/FWD            -6943

                  FOLIO 7
```



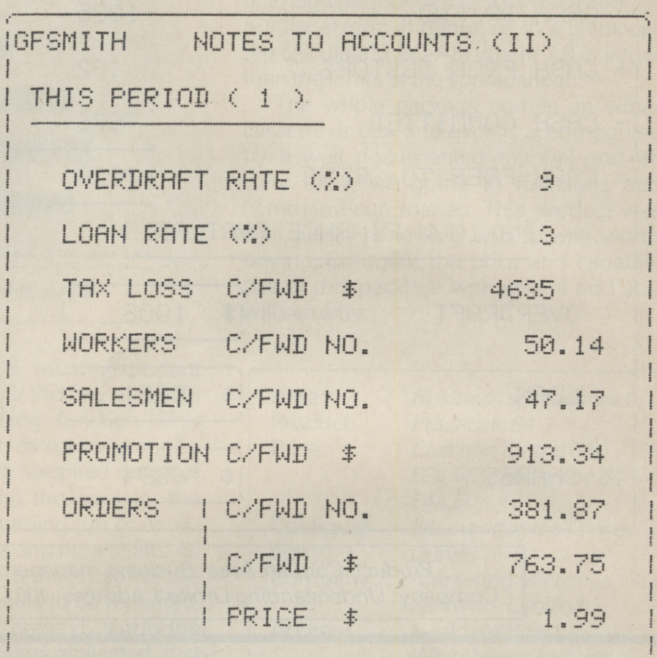
```
GFSMITH    BALANCE SHEET(I)    PERIOD 1

 FINANCE                        VALUE($)
 -------                        --------

  SHAREHOLDERS' FUNDS            2357

  LONG TERM LOANS                5000
                                --------
  CAPITAL EMPLOYED               7357

    CREDITORS            5973

    OVERDRAFT            1036

   CURRENT LIABILITIES ------    7009
                                --------
 TOTAL FINANCE                  14366
                                --------
```



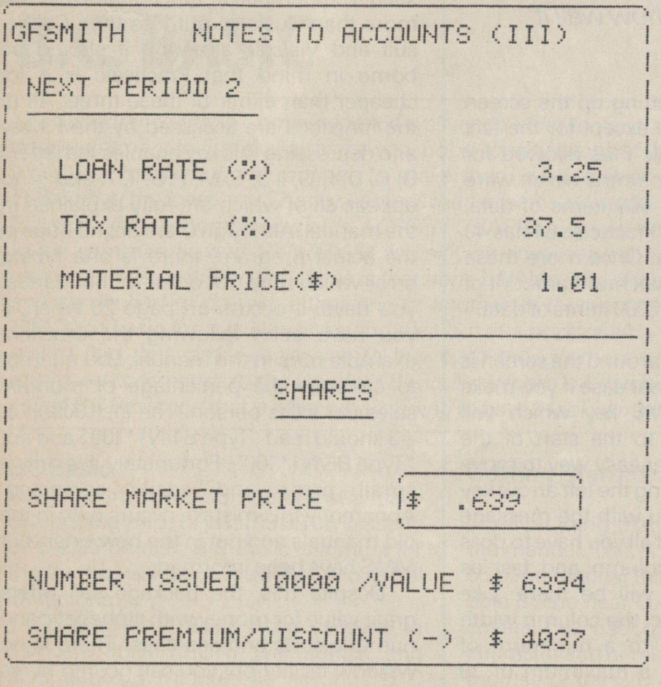
```
GFSMITH   BALANCE SHEET(II)   PERIOD 1
   ASSETS                       VALUE($)
   ------                       --------

    PLANT                          3000

    MACHINERY                      6027
                                 --------
    FIXED ASSETS                   9027

      STOCKS              3350

      DEBTORS             1989

      CASH                   0

    CURRENT ASSETS       ------    5339
                                 --------
    TOTAL ASSETS                  14366
                                 --------
```



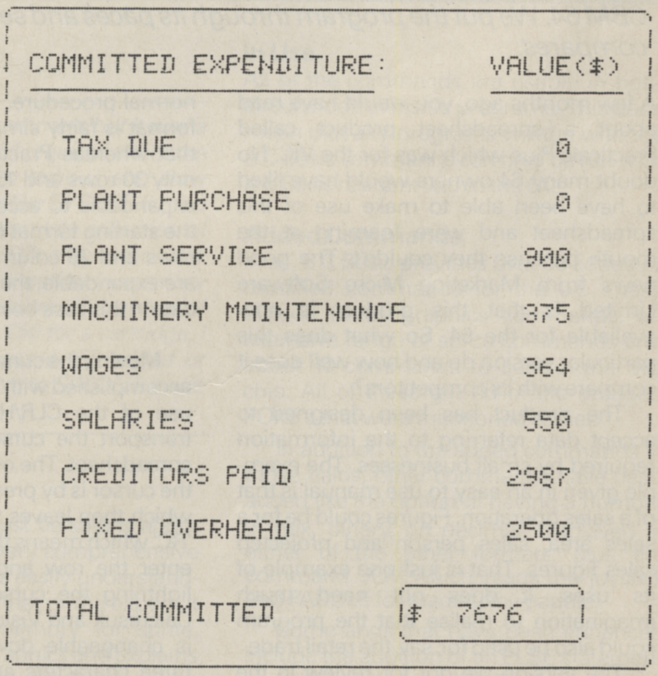
```
GFSMITH     NOTES TO ACCOUNTS   PERIOD 1
 MACHINERY                       NUMBER

  PRODUCTIVE MACHINES B/FWD        50

  LESS DEPRECIATION                 5

  ADD ON STREAM                     4

  (AGE:    10)            C/FWD    49

  ORDERED MACHINES        B/FWD    10

  LESS ON STREAM                    4

  ADD PURCHASED                    34

                          C/FWD    40
```



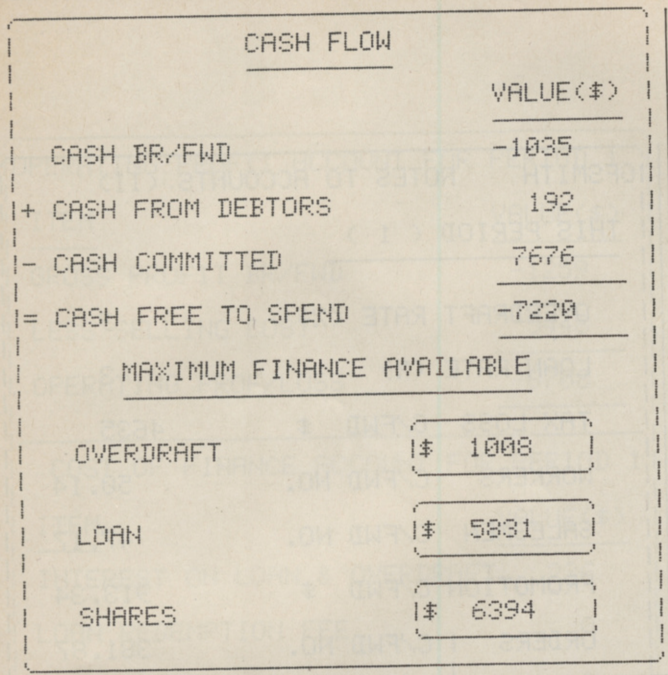
```
GFSMITH     NOTES TO ACCOUNTS (II)

 THIS PERIOD ( 1 )

   OVERDRAFT RATE (%)               9

   LOAN RATE (%)                    3

   TAX LOSS  C/FWD  $            4635

   WORKERS   C/FWD NO.          50.14

   SALESMEN  C/FWD NO.          47.17

   PROMOTION C/FWD  $          913.34

   ORDERS  | C/FWD NO.         381.87
           |
           | C/FWD  $          763.75
           |
           | PRICE  $            1.99
```



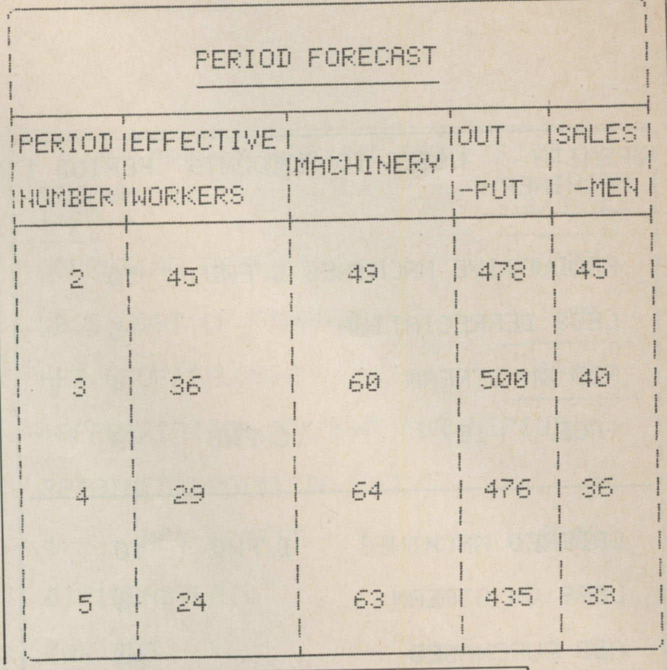
```
GFSMITH    NOTES TO ACCOUNTS (III)

 NEXT PERIOD 2

   LOAN RATE (%)                3.25

   TAX RATE  (%)                37.5

   MATERIAL PRICE($)            1.01

                 SHARES

 SHARE MARKET PRICE      |$  .639  |

 NUMBER ISSUED 10000 /VALUE  $ 6394

 SHARE PREMIUM/DISCOUNT (-)  $ 4037
```



```
COMMITTED EXPENDITURE:      VALUE($)

  TAX DUE                          0

  PLANT PURCHASE                   0

  PLANT SERVICE                  900

  MACHINERY MAINTENANCE          375

  WAGES                          364

  SALARIES                       550

  CREDITORS PAID                2987

  FIXED OVERHEAD                2500

 TOTAL COMMITTED           |$  7676 |
```



```
              CASH FLOW

                                   VALUE($)

 CASH BR/FWD                       -1035
+ CASH FROM DEBTORS                  192
- CASH COMMITTED                    7676
= CASH FREE TO SPEND               -7220
      MAXIMUM FINANCE AVAILABLE

  OVERDRAFT                 |$  1008 |

  LOAN                      |$  5831 |

  SHARES                    |$  6394 |
```



```
              PERIOD FORECAST

|PERIOD |EFFECTIVE |          |OUT   |SALES |
|       |          |MACHINERY |      |      |
|NUMBER |WORKERS   |          |-PUT  | -MEN |
|   2   |   45     |    49    | 478  |  45  |
|   3   |   36     |    60    | 500  |  40  |
|   4   |   29     |    64    | 476  |  36  |
|   5   |   24     |    63    | 435  |  33  |
```

Product: *Corplan.* Area: *Business management.* Configuration: *8032, disc drive and printer.*
Company: *Understanding Limited.* Address: *100 Cricklewood Lane, London NW2 2DS.* Tel: *01-580 6625.*

PRACTICALC FOR THE 64

We recently reviewed Practicalc Plus, a spreadsheet product for the VIC 20. Now the same company have come up with a version for the CBM 64. We put the program through its paces and see how well it compares.

A few months ago, you would have read about a spreadsheet product called Practicalc Plus which was for the VIC. No doubt many 64 owners would have liked to have been able to make use of this spreadsheet and were foaming at the mouth because they couldn't. The good news from Marketing Micro Software Limited is that this product is now available for the 64. So what does this particular version do and how well does it compare with its competitors?

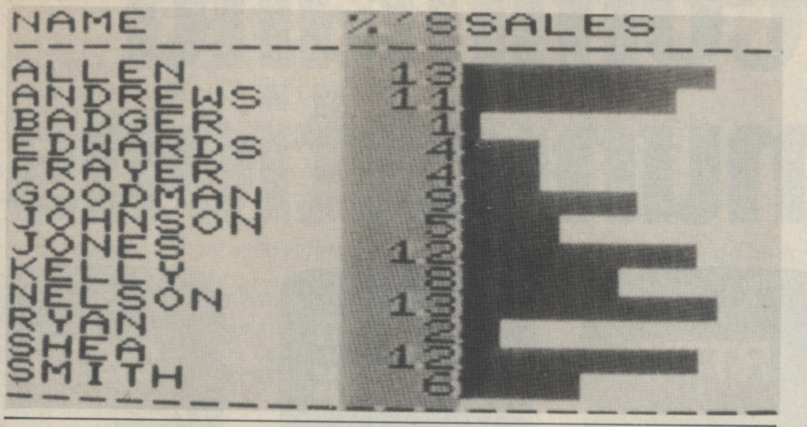
The product has been designed to accept data referring to the information required by small businesses. The example given in an easy to use manual is that of a sales operation. Figures could be for a sales area, sales person and projected sales figures. That is just one example of its uses. It does not need much imagination to realise that the program could also be used for, say, the retail trade.

The version we got for review in the offices of Commodore Computing International had been put onto a disk, although it is possible to load the program from cassette and this is done by the normal procedure. Setting up the screen format is fairly simple except for the fact that whereas Practicalc Plus allowed for only 30 rows and 15 columns which were expandable to accept 600 items of data, the starting format for Practicalc 64 has 40 rows and 25 columns. Once more these are expandable, the maximum amount of data in this case being 2000 items of data.

Moving the cursor around the screen is accomplished with great ease if you make use of the CLR/HOME key which will transport the cursor to the start of the spreadsheet. The other easy way to move the cursor is by pressing the left arrow key which then leaves you with the message 'RC' which means that all you have to do is enter the row and column and fast as lightning the cursor will be there. Like Calcresult and Visicalc, the column width is changeable down to a minimum of three characters and a maximum of 38 characters. In either case, the information to be entered appears in the data line at the top of the screen and is then entered into its correct location in the display.

However, there are times when the information will appear on the function line which is directly below the data line. This occurs most frequently in the case of performing calculations. There are 22 such mathematical functions, which is more than Busicalc but less than Calcresult and Visicalc although it should be borne in mind that Practicalc is a lot cheaper than either of these three. All of the functions are accessed by the F3 key and depressing this key enables the letters B, C, D, F, G, I, J, L, M, P, S, T, X and @ to appear, all of which are fully explained in the manual. Although there are no bugs in the actual program, there is one typing error which may not occur in the manual you have. It occurs on page 26 when, if you have been following the excellent example runs in the manual, you attempt to calculate the percentage of monthly sales per sales person. The instruction at #3 should read "Type B1/N1*100" and not "Type B6/N1*100". Fortunately it is only a small error and easily corrected. Apparently this mistake occurs only in the old manuals and not in the new ones, but MMS have been informed.

Despite this, the package still offers great value for money with alphabetic and numeric sorts and searches. There is no window facility, but you can go into hi-res and low-res graphics which represents data in the form of a bar chart or a histogram. When the program is first loaded, the low resolution mode is in



```
NAME          %'SSALES
----------------------
ALLEN
ANDREWS
BADGER
EDWARDS
FRAYER
GOODMAN
JOHNSON
JONES
KELLY
NELSON
RYAN
SHEA
SMITH
----------------------
```

A display showing Hi-res Graphics and bar chart on the Practicall 64

operation where nine asterisks are equal to nine spaces. With the hi-res graphics mode the same quantity is represented in one-eighth the space of low resolution. In other words any value less than or equal to 72 can be graphically represented.

Having explained what the F3 key is all about, you need to know about F1, 5 and 7. Pressing the F1 key means that an F will appear on the data line and means that the information is a mathematical function and may be entered as such by pressing RETURN. The calculation of the function is not immediate but it will appear wherever the cursor is positioned. For instance this is the key that must be used prior to deleting a specific location, column or row.

One of Practicalc's most important features is provided via the use of the F5 which is the replicating function. This means that data or formulae can be repeated throughout a specified range of the spreadsheet saving the operator the boring and time-consuming job of entering the same data time and time again. All you have to do is move the cursor to the location where the data is to be repeated, type the data and then press F5. If only the format of the cell is being replicated, just type $ and the row and column. Just the latter two criteria will need to be typed in the case of replicating a formula or an entry.

The final function key is the F7 key and this has the sole function of acting as an escape key. Error messages will appear under four circumstances: 1) Division by 0; 2) Square root of a negative number; 3) Syntax errors; 4) reference to a blank cell (eg calculating BO-A8) where A8 is larger than the limits of the spreadsheet.

The whole package comes on either cassette or disk and each is accompanied by a well documented manual and an easy reference guide to functions and command summaries. This product was well worth reviewing and is well worth buying. Compare the price and capabilities of this package with others and you will see why.

Area:	*Business spreadsheet*
Product:	*Practicalc 64*
Price:	*Cassette for the 64, £39.95, disk for the 64, £44.50.*
Configuration:	*64, monitor, disk drive, printer.*
Company:	*Marketing Micro Software Limited*
Address:	*Goddard Road, Whitehouse Industrial Estate, Ipswich, Suffolk IP1 5NP*
Telephone:	*0473 462721*

B.C. BASIC

The appearance of the Commodore 64 was a god-send to we programmers but it was a disappointment to find that all of the very good specifications of the 64 required either the writing of machine code routines to make them work fast or very tedious and slow POKEing of the locations. The appearance then of software packages like SYSRES-64 and POWER-64 for programming aids, SCREEN GRAPHICS-64 with a complete collection of hi-res commands, and SYNTHY-64 for playing music using the SID chip were very welcome. The problem with these is that none of them would work together in memory and so we had to do with either one or another of them on their own. The arrival of SIMONS' basic for the 64 was a good idea but at a price of around £50 for a cartridge, I would find that rather expensive to buy even though there are some 150 added or improved commands to the standard Basic. Now there is a competitor to SIMONS' basic called B C Basic and that is what we are going to have a look at now.

B C Basic

Available from B C Computers, at a really astounding price of just £19.95 on cassette or £22.95 on disk, B C Basic is a must for those who wish to utilise their 64 to its full limitations.

To load B C Basic from cassette, a standard (SHIFT/RUN) will suffice and after about 3 minutes 45 seconds B C Basic is loaded and ready to be used. For the disk version, LOAD"*",8 and RUN will load it.

Getting Started

The first thing that must be said is about the manual. This is a very comprehensive 55 page manual that is easily understandable by the near beginner or the expert. It covers the use of memory for sprite, character and hi-res graphics and explains the use of the SID chip. All this time, the manual gives examples of how its own commands can be used to give the required effects.

In Use

All of the commands are usable in both direct mode or inside programs. This does mean that any programs written with the B C Basic commands can only be run with B C Basic resident within the 64.

Added Commands

In all, B C Basic provides over 90 added or modified commands for the 64. These include hi-res graphics commands, an extensive range of sprite commands and about 10 commands to control the SID chip. All of these get rid of the dreaded POKE's that were mentioned earlier.

In addition to the added commands in those fields, other commands have been added like the option of having a number in hex, binary, on decimal, displayed in either of the other formats, plus the command JOY which reads the joystick and PADDLE for reading the paddle.

Commands that have been enhanced include the addition of an ELSE statement on to the end of the IF .. THEN statement and AT added to the PRINT statement to give PRINT AT x,y followed by some text.

(continued overleaf)

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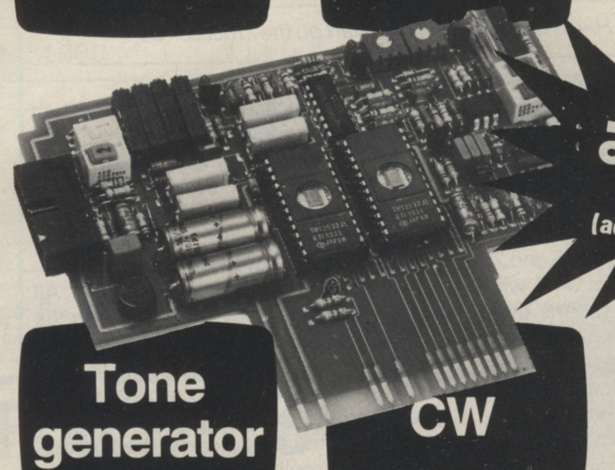

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Tone generator

CW

Word processor

ComputerWorld's COM-IN 64 communications interface turns your Commodore 64 Personal Computer into an advanced (radio)communications terminal for BAUDOT, MORSE, ASCII, SSTV, Wordprocessor, Modem and Tone generator.

Plug in the interface, switch on your Commodore and the system is in operation! Over sixty commands are recognised by the COM-IN 64 program to ensure maximum operation convenience.

Major features of the COM-IN 64 program:

- Written in fast and efficient 6502 machine language.
- Baudrates 45, 50, 75, 110 and 300, each adjustable with fine tuning system.
- Maximum Baudrate approx. 1500 in word processing mode.
- Morse speed 5 to 99 words per minute.
- Split screen. Compose and edit text while receiving.
- 12 K byte text buffer in memory.
- Three active cursors. Receive, transmit and keyboard.
- Store received and transmitted messages on diskette.
- Disk-based mailbox system.
- User definable WRU.
- Create brag tapes on disk or cassette files.
- Transmit disk or cassette files.
- Hard copy available with a printer.
- Automatic word-wrapped carriage return and line feed. On transmit selectable.
- Unshift on space selectable.
- Seven 80 character message buffers with display, print and write options.
- Load and save message buffers on tape or disk.
- Software controlled CW sidetone, ASCII and BAUDOT AFSK.
- 14 tones selectable for adjustment purposes. (4 for modern adjusting).
- Sync idle, slow mode and word by word mode.
- Auto transmit/receive switch for telephone line.
- Replay received message with resend command.
- Four CW identification options.
- CW FSK identification for RTTY.
- RYRY generator (baudot RTTY test signal).
- Quick brown fox generator.
- Several callsign generators available.
- Received text word-wrapped at end of screen lines.
- Keyboard selectable normal/reverse tones for all modes except for CW transmit mode.
- Direct mode for fast break-in operations.
- 24 hour real time clock displayed on status line. (CIA TOD clock with automatic 50/60 cps selection).
- Send current time with QTR command.
- Random mode sends 5 character groups for morse practice.
- Loop mode for printer adjustments or beacon-like operation.
- Keyer mode allows connection of manual Morse paddle.
- Unique large TIMES SQUARE character display option.
- Ignore carriage return on receive option.
- User definable switch facility.
- Page mode allows reception of RTTY pictures etc.
- Byte mode allows transmitting program files.
- Modem mode with automatic Bell/CCITT selection.

Further details:

ComputerWorld's COM-IN 64 program is supplied with self supported power supply, cables and connectors. In the extensive 70 page user manual you'll find the complete schematic and 2 program listings for QHT locator and LOGBOOK.

How to order:

Send a postcheque or your MasterCard/VISA credit card number (with expiration date!), your name and full address to:
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Phone: (31) - 35 - 12633. Telex: 43776 - NL.

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Hi-Res Commands

These include commands such as PLOT, DRAW, HPRINT, CLG etc. Also, the commands that are well known from the sinclair spectrum as PAPER, BORDER, and INK have been included. The hi-res screen is selected by use of the command MODE and two hi-res screens can be used at the same time.

By using the command SCRWAIT, you can wait until the raster scan is zero (off the screen) before making changes between screens and thus avoiding any flicker at change-over.

Sprite Commands

There are a full batch of commands for controlling sprites (24 in all) that cover all of the requirements for displaying sprites and defining them. Also some commands for defining and setting up user defined characters.

Sound Commands

There are 16 commands set up to make the use of the SID chip much easier. These cover all aspects from the envelope to the filters.

Other Commands

Additions to the 64's standard control commands are:

REPEAT ... UNTIL loops

! – a four byte poke

' – a two byte low-high order poke

% – precedes a binary number

& – precedes a hex number

@ – precedes a dec number for hex printout

AT y,x – position the cursor. Can also be in PRINT

BIN$(dec no) – converts dec number to binary

CLR has been updated to clear repeat ... until loops

CODE converts ascii codes to screen POKE codes

ELSE is added to IF ... THEN statements

FRE has been updated to display true free mem and not negative

HIMEM prints the value of locations 55 and 56*256

INSTR finds the position of one string within another

JOY, JOYX, JOYY to read joystick

KEY returns ascii code of key being pressed

KEY$ returns the key being pressed as a string

MSAVE saves specified area of memory to tape or disk

PADDLE reads the paddle

POP removes a value from the subrtn stack

PORT for output or input to or from the user port

REPEAT starts the repeat ... until loop

RESTORE has been altered to enable a restore to a line number

RUN has been modified to clear the repeat ... until loops

UNTIL ends the repeat ... until loop

VAL has been modified to cope with the hex or binary notation.

Conclusions

At £22.95 for the disk based version, I would say that this is a very good and useful package.

Area:	*Basic Enhancer*
Product:	*B C Basic*
Price:	*£22.95 disk* *£19.95 cassette*
Configuration:	*Commodore 64 with disk drive or cassette*
Company:	*B C Computers*
Address:	*31A Grosvenor Avenue* *Long Eaton* *Nottingham NG10 3FQ*
Tel:	*(06076) 65489*

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Commodore 64

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EXTERMINATOR Definitely one of the best arcade action games around for the 64. Shoot the worm and everything else in the garden whilst avoiding the deadly spider and swooping eagle. Machine code using high resolution and Sprite graphics with excellent sound. Beware, it's very addictive. £5.99

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ADVERTISER Amazingly turns your 64 into a musical moving message display machine. Ideal for shops, clubs, etc. £5.99

unexpanded VIC 20

EXTERMINATOR Fast action arcade game in which your task is to destroy the worm who is out to get you. Watch out for the eagle which will pounce on you just when you think you're safe. High resolution machine code. £5.99

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BUBBLE BUS, 87 HIGH STREET, TONBRIDGE, KENT TN9 1RX. DEPT. CCI 11/83.

Road Toad

As the title suggests, this is a direct descendant of Frogger, in that the user has to get from one side of the road to the other. This cassette based game for the 64 from Audiogenic attempts to get the player involved in the mating habits of the toad, as he attempts to join his loved ones who are already across the road. The screen display is split into two, the lower half being the busy main road which has to be crossed without being squashed by hundreds of vehicles. The second part of the screen is a river which you have to cross by jumping onto the back of leaves and logs. It is also worth keeping an eye on the bonus counter at the bottom of the screen because when this reaches zero, the games goes and takes a running hop and ends.

Not only do you have to watch out for the vehicles and make sure you do not drown in the river, but as you advance from level one you come across friendly yellow turtles, unfriendly green turtles, crocodiles and a horrible toad-eating snake!

The mating bit comes into the game (and so do more points) when you have to jump on top of female frogs which appear to sit on logs.

Very addictive game and very frustrating as well, but very well worth buying at £8.95.

Lunar Rescue

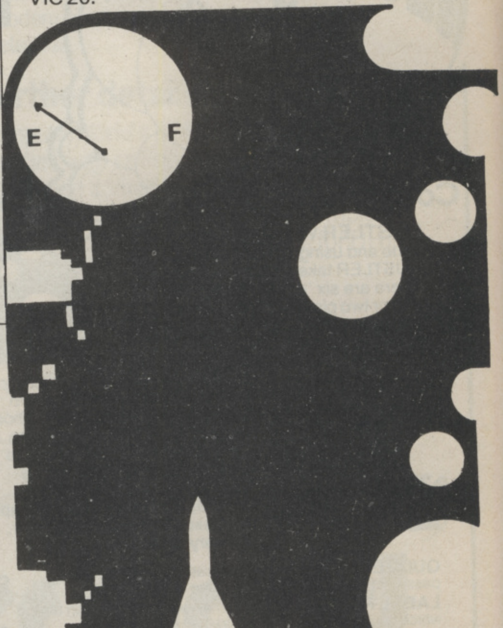
Lunar Rescue, from Mr Chip, comes on tape format for the 64 and takes a very long time to load even by cassette standards. This is the type of game that some other firm has done before, and done it better.

The object of the game is to rescue several stranded scientists from a planet and the only way to do this is by piloting a mother ship through asteroids and aliens which travel in opposite directions horizontally across the screen. You must avoid these on both the descent and ascent of your ship because the consequences of contact are rather deadly and quite spectacular.

There are several means available to avoid contact. Movement is either left or right by the = and ; keys and you can slow your rate of descent down by using the A key which is also the key you use to release the rescue ship.

At the top of the screen is a point score and a fuel table. There are 50 points scored for rescuing one scientist with an extra ten points if the ship is returned safely to the mothership. Further points are scored on the way back if one of the aliens is shot down. However this is unlikely because, although the graphics are quite good they are very slow and no matter how often you press the fire button, the response is not very good.

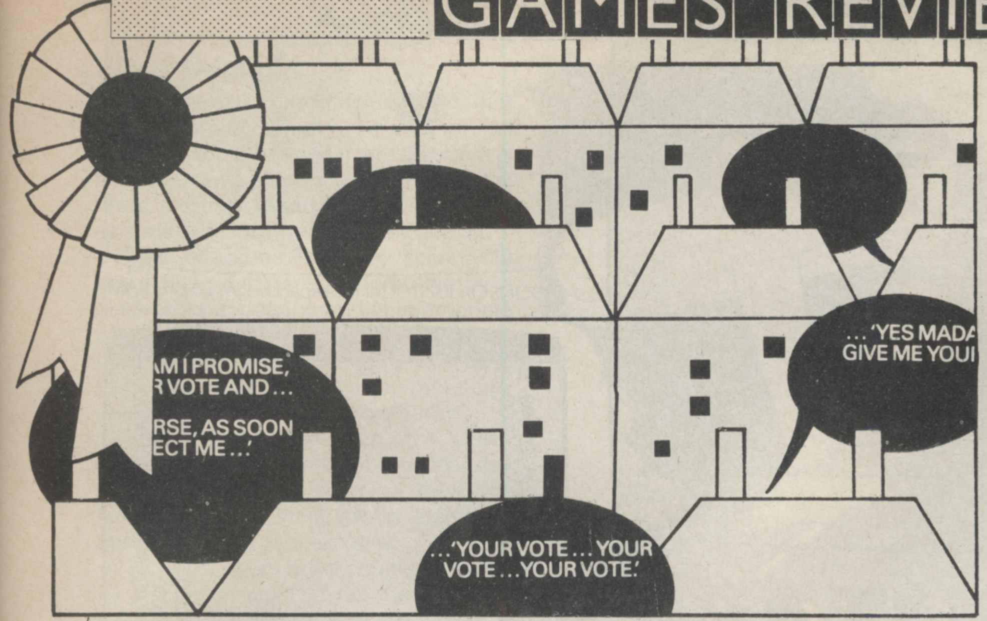
No joystick control is required to operate the game which is not really surprising because although it has been written for the 64, the quality is definitely VIC 20.



Envahi

Envahi is a little bit similar to Creepers in that it comes from the same software house and you need to shoot down the advancing aliens. Envahi is the name of the city you are defending from your helicopter and to make matters worse, the city is right next to a dam which is subject to penetration by the munchers who eat away at the wall of the dam. Once the dam is breached, then I hope you can swim because the city gets flooded and the game is over. Apart from the danger of being flooded out, once the building has been landed on by a nasty then you have been invaded and you have lost one of your lives – which is also the case should you decide to crash into the aliens or one of your own buildings. You have also got to watch out for an alien that swoops down from the sky and kidnaps you. To make the game just that little bit more silly, a rain cloud appears occasionally and believe it or not the helicopter is water soluble.

This is quite a good game even though it does take a long time to load. Perhaps this is because, at the top of the screen are adverts for Virgin's other games.



Westminster

If you have ever wanted to get into politics but have never had the means nor the finance to do so, now is your chance thanks to a brilliant game from Mr Chip. The game is called Westminster, is supplied on cassette and is for the 64.

You might be put off by the fact that there are pages and pages of rules but these are needed to properly understand a very complex game that is very easy to operate and very entertaining. In fact the major key used is the return key.

As the title suggests, the game is all about politics, general elections and who should enter the resplendent hallway of 10 Downing Street.

In such a game like this, there are few openings for the use of graphics but, to the credit of Mr Chip, the game has been devised so that it resembles a general election as close as possible and the graphics capabilities come into effect when the displays of newspaper headlines, opinion polls and the final results become known – you can even get a helicopter to do a quick tour round the country!

The rules of the game are that there are the four main parties (hence there can be from one to four players) who each tour about 60 constituencies gaining votes according to how much money is spent on canvassing. There is any number of canvassing rounds, with 120 guaranteeing about one hour of play.

The colour capability of the 64 is well used, with the border colour representing the party colour and the background colour the party that is leading in that constituency.

This is an excellent game that is well worth buying and just goes to show that you do not have to have ample graphics to produce a good game. Mr Chip are definitely onto a winner with this game even though it may not appeal to those who have no liking or knowledge of politics. This game is very well thought out and well produced. Well done!

IMPACT SOFTWEAR
VIC 20

PERILOUS POST
As the brave postman in the van you must cross the railway tracks and rivers to deliver your parcel to the housing estate. The estate is patrolled by traffic wardens who will try and catch you, but you can run them over if you find a sunflower. (!!??) Expanded screen. KB/JS
ANY VIC 20 £6.50

TERMINATOR
High speed machine code space battle with hi-res graphics and full colour. 16 different aliens plus the deadly zaggers and meteors. Expanded screen. Joy stick or keyboard.
VIC 20 (Any) £6.50

COSMIC KNOCKOUT
Combination of knockout and space battle. Keep the satellite from crashing to the bottom of the screen. You can create blocks by shooting the aliens, also if you shoot the satellite it will return to the top of the screen, but this will speed up the game. In your armoury are three smart bombs which when released will turn all the aliens on the screen into blocks. Expanded screen. Joy stick or keyboard.
VIC 20 (Any) £6.50

STARTREK
Save the galaxy from the Klingons using rapid fire phasers and photon torpedos. Automatic short range scan, galaxy map and star bases. Full sound effects and save game facility.
VIC 20 8/16K £5.00

GALAXY ATTACK
Destroy the attacking formations of aliens then battle your way through the fireballs to encounter the meteors. High speed machine code and hi-res graphics. Expanded screen. Joy stick or keyboard.
VIC 20 (Any) £6.50

ORB
Make your way through the under ground labyrinth in your search for the dreaded Orb, which you must destroy. Encounter many monsters, discover treasure and try to remember your route so that you can get out again. Save game facility.
VIC 20 16K £5.00

GAMES PACK
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VIC 20 (Unex) £5.00

CITY BOMBER AND SNAKE CHARMER
Bomb the city to land your plane. Guide your snake which is growing longer around the screen, avoiding the mines, sides and your tail.
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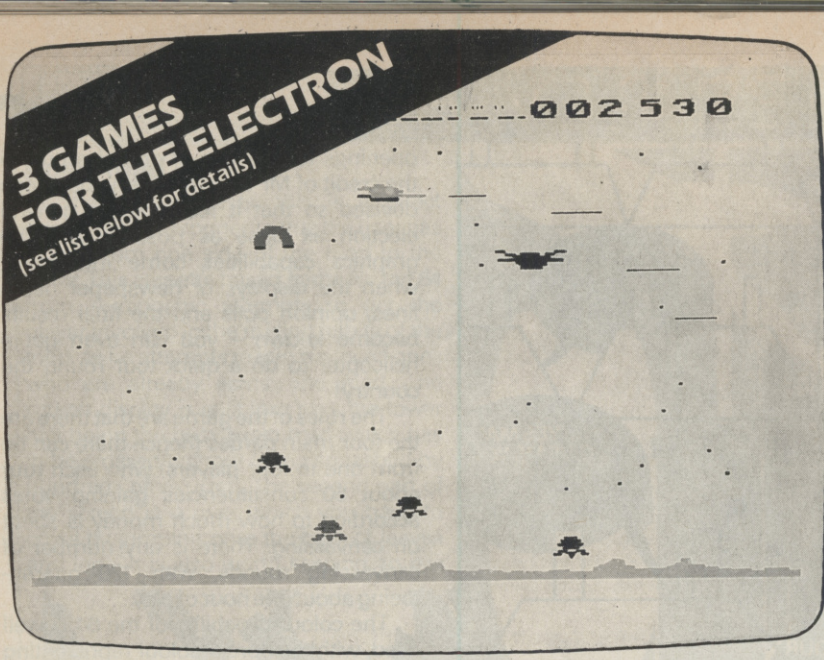
MACHINE TYPE__________
CASSETS REQUIRED__________



3 GAMES FOR THE ELECTRON
(see list below for details)

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Space Attack		£5.99
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Birds of Prey		£6.99
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ZX 81

Super Nine – 9 1K games		£4.99
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ORIC

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See-Saw Scramble		£9.99

LYNX

Atom Smasher	**NEW**	£9.99
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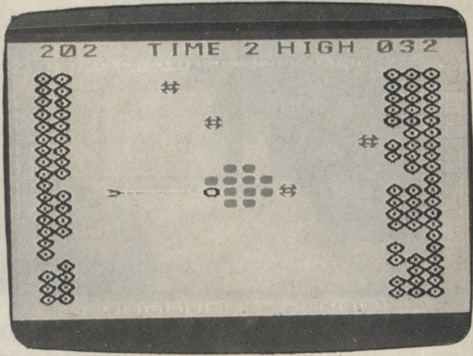
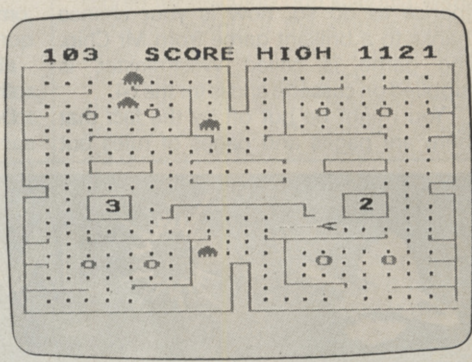
Floyd's Bank	**NEW**	£9.99
Power Blaster		£9.99

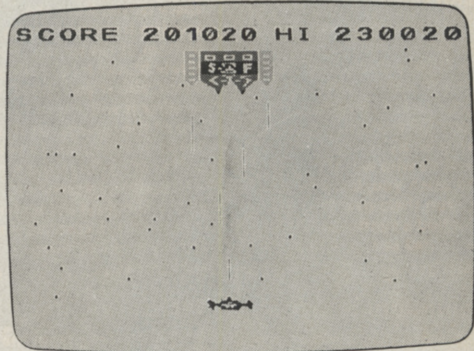
MOONS OF JUPITER for the expanded Vic 20 (any RAM)



ATOM SMASHER for the unexpanded Vic 20



POWER BLASTER for the unexpanded Vic 20



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GAMES REVIEW

Super Dogfight

This is a new game for the 64 that comes from a company called Terminal Software and this is again on cassette. It is for one or two players but two players is more exciting because the aim of the game is to destroy the opposing aircraft.

This is accomplished by scoring 10 direct hits which are recognisable by a black cross appearing on the appropriate plane and one hit being added to the individual score. Once the 10 hits have been accumulated, there is no more play unless you hit the F1 or the fire button.

The dogfight takes place on a screen that is supposed to resemble a clear day with good visibility although there are banks of dense white cloud that have parted to form a natural arena.

However, there are a couple of things which detract slightly from the quality of the game. The first is the fact that firing at the enemy is not very rapid as well as the tendency for the action to actually stop quite frequently even though it is written in machine code. This is very annoying. The other thing is something that is missing. It often seems to appear that the two aircraft have passed through each other as if they weren't there and this goes unnoticed by the 64 because there is no collision detector in the programming of the game.

The end of the game is quite interesting to see as well. The defeated plane dives through the clouds and crashes. You, as a pilot, are treated a bit more kindly as you are parachuted to a safe and comfortable landing. The sound effects are quite realistic as well.

Creepers

Yet another of the recently launched games for the VIC 20 from Virgin Games and this one, called Creepers, is another of those shoot-the-aliens-before-they-get-you type of games. This one was written by a gentleman called Nick Rowden and needs either 3K or 8K expansion.

The idea is that you are the controller of the last fighter defending your subterranean cities energy supply which is, of course, subject to attack from aliens which cling to the top of the screen.

The supply of energy is represented by a series of blocks along the base of the screen, and each time the aliens pick up one block, they add the energy to their own power source.

At first the aliens swoop one at a time, but this increases as they are destroyed until you get to the stage where the whole roof seems to cave in. Once a particular column of energy blocks have been destroyed, that is when the aliens turn nasty and, unless you've managed to master the game by that time, you die very quickly.

Scoring points is as follows:

Aliens going up 60 points
Aliens going down 30 points
Mutant 100 points
Watchers on the first screen 50 points
Watchers on following screens 100 points

This is an interesting game to start with that requires fast reactions on the fire button. However, once the game has been mastered, it becomes fairly simple and loses its hold on the player.

Stix

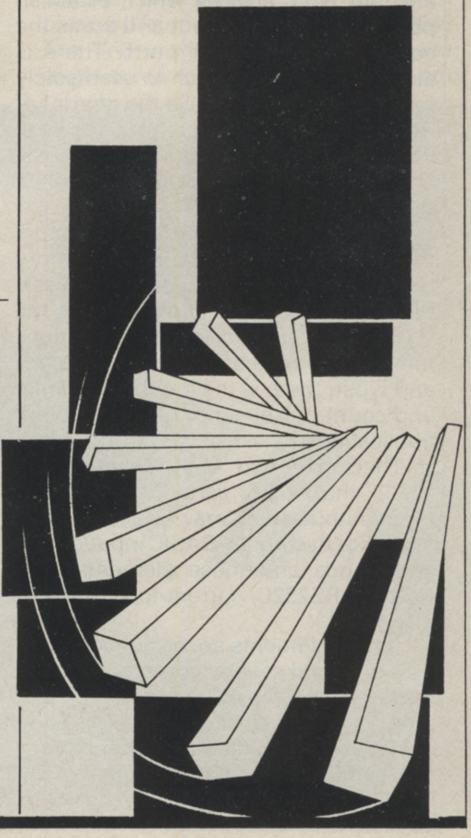
Supersoft describe this game as being 'the next generation of arcade games' and it will be interesting to see if other software houses take up their lead. Working on the 64, Stix does not have space invaders, camels or laser cannons.

There is nothing to destroy, nothing to find and really very little to do. The first screen presents the player with a large box inside which is an array of lines which move randomly around.

You play the part of a little spark positioned on the border of the box which, with the help of the fire button and the joystick (you can operate the game with the keyboard but joystick operation is far easier) makes regular incursions inside the box. The idea is to connect two unspecified border points together and thus restrict the movement of the sticks to anything less than 25% of its original area.

All of this sounds pretty simple so far, but you must make sure to avoid two 'fuses' as well as the sticks. If either of those touch you, you've blown a fuse and have to start all over again. Points are awarded according to the speed with which you trap the sticks.

This game is quite good fun as it is not easy to master although it looks deceptively simple. This cassette based version, which is based on the arcade game Qix, costs £9.20. This may start a craze, but has it got the staying power of other games?



The VIC-2 board from Tri-Lines

The VIC-2 board is an easy to install board that controls many features and opens up many possibilities since the VIC-2 firmwave has been designed with the CBM 2000, 3000, 4000 and 8000 series machines in mind. The first of its major advantages will be noticed by the user when the board is installed. This is deceptively simple because all you have to do is remove the 6502 chip which is then inserted into the VICY buffer card which is then in turn placed in the original processor socket on the CBM board. All you have to do next is mount the board, install the power leads and connect VICY to VIC-2. It is as simple as that!

Batteries are also required for the clock/calendar as well as for the VIC-RAM and the manufacturers recommend that the voltage of these should be between 2.5 and 3.5 volts.

For the input and output of data there are four 6522 devices which establish parallel input and output and act as the equivalents for 8 user ports. There is also a fifth device which is used solely for internal purposes like the control of the clock/calendar which gives the year, date, month, hour, minutes and seconds and will continue to function even when the CBM is switched off.

These Versatile Interface Adaptors may be accessed by the usual memory read/write instructions such as Peek, Poke, sta and sty. This means that the VIA can be applied to all applications that need to read and monitor switches and when there is the need to generate and count pulses amongst many other applications.

There are two 6551 elements on VIC-2 that take care of bit serial input/output which may be accessed on a register basis or by BASIC input/output commands and these elements both have an RS232C, current loop and TTL interface.

All the elements are assigned device numbers and several commands apply in each case these being close, cmd, input#, verify, list, save, load print# and get#. This latter statement operates in a way similar to that of the get on the CBM keyboard in that the statement returns nothing if no character is available at the time of command execution. Save means that the command outputs a memory block where each byte is unpacked into either low or high hexadecimal characters and when the user is in data mode and a close statement is omitted the manufacturers warn that this may make the RETURN key on the CBM keyboard inoperative. Escaping from this situation is simplicity itself because all you have to do is make a syntax error and follow this by hitting the return key. You must also make sure that you do not configure any VIA or ACIA device for a communication mode that does not correspond with that of the external device. This may cause computer deadlock, a situation escaped from by using the 'extended stop key'.

This is one of the additional keyboard functions. The STOP key means that control is passed to the BASIC interpreter. This can be changed key POKEing STOPVEC,x1:and STOPVEC+1,x2. If x = nostop, then the stop key will be disabled and in such a situation where this key is no longer operable, it may be helpful to hold this key down (thus bringing into effect the 'prolonged stop key') for a few seconds since this forces the computer to return to the BASIC interpreter. The other main keyboard function is operated by touching the space bar which suspends screen output.

There are several other useful features which are not associated with the keyboard. For instance with regards serial input/output a fifo input buffer is associated with each ACIA receiver port, these buffers being located in the VIC-2 RAM. If the charaters enter at a rate higher than that at which they are pulled from the fifo, an overflow may occur. VIC-2 then resets the buffer so that all characters resident in the buffer are lost. This overflow problem can be avoided by adopting a low baudrate or by applying an appropriate synchronisation technique like the receiver synchronisation.

This can be established in three ways. 1) Using the SRTS output so that SRTS reverts to nought when the buffer is full; 2) Using the XON/XOFF procedure so that XOFF is sent when the buffer is full and XON is sent when the buffer is empty; 3) Using the Receive-echo so that each character received is sent back and this echo used as the external transmitter as a signal to transmit the next character.

Now on to the VIC-2 RAM. This is 1Kbyte with approximately 760 bytes reserved for the storage of a user-generated program.

If a program is saved with a null string as its filename, then each time the microprocessor is reset, the program resident in VIC-2 RAM is automatically transferred to CBM memory and executed.

Besides this there are several other very useful features, these being the interrupt management device, logical file numbers, watchdog, power down detection and system expansion.

The interrupt device on the VIC-2 detects, services and manages interrupt sources of which there are five, the IEEE bus service request line and the CA1 pin of VIA2, 3 and 4. There is also the CBM internal interrupt generator which forces the CBM clock update and keyboard handling at regular intervals.

Computer irregularities are detected by the watchdog and thus any mistakes like that of a processer executing an illegal statement is prevented. When the program fails, the watchdog resets the computer.

A Hewlett-Packard also appears on the VIC-2 in the guise of an integrated circuit, the HCPL 3700, that generates a pulse when the power down is detected and the extension connector J8 contains all microprocessor bus lines and includes control signals. However, no signals are buffered.

Product:	*VIC-2*
Area:	*Motherboard*
Configuration:	*VIC*
Company:	*Tri-Lines Limited*
Address:	*PO Box 4DE,* *London W1A 4DE*
Tel:	*01-580 5824*

The VIC20/64 and the Sinclair!!

Commodore Business Machines and Sinclair Research are not exactly on the friendliest of terms commercially speaking. They never finance joint products together and are not on 'handshaking' terms. So how has it come about that the VIC20 and the CBM64 can now output onto the ZX printer?

This is not through any direct planning structure of Commodore or Sinclair, but is the result of an intermediate independant company called Softex Computer Accessories. They have designed what they call the ZX Printerface which is simply an interface connecting the ZX to the 64 or the VIC (but the Printerface will also operate the Alphacom 32 printer and Softex are currently working on a routine to run with the Printerface to allow 80 columns of print with either printer).

To be able to make use of the system, a fair amount of equipment is needed excluding the VIC/64, a television or monitor and a cassette player. From Sinclair (dare we mention that name again in this magazine) you need to get the actual printer and power supply which is accompanied by manual and reams upon reams of paper. Then, from Softex, you need the Printerface cable, cassette and manual. Once all the equipment has been gathered, putting it together is a simple matter of connecting the interface cable to the 20/64 and the printer, connecting the monitor, plugging in the ZX power supply and loading the cassette.

One side of the cassette has a version for the 64, the other a version for the 20, both of which work equally well although there are slight differences in programming needed to run the different versions.

In fact, the only bad thing about the product is with regards to the actual printer. Ths is rather slow and very, very noisy.

The program that comes on the cassette is 512 byte machine code, the purpose of which is to convert the VIC/64's characters to dots that build up the characters on the printer. This is LOADed and RUN in the usual way and following on from this you can go straight into the workings of the system. The manual advises that the first step is to print the following:

```
10 OPEN1.4
20 FORX=1TO10
30 PRINT#1,"HI THERE"
40 NEXT
50 PRINT#1:PRINT#1:PRINT#1
60 CLOSE1
```

The Printerface has its own storage buffer so it is possible to print something out one bit at a time, until the buffer has 32 characters in it and will print it out all at once.

Listing is accomplished quite easily with OPEN1, 4: CMD1: LIST and then PRINT#: three times. This produces a result which is quite clear although the printer does tend to smudge just a little bit. CMD1 is the major command in the above instructions as this directs all output to the printer (note the device numbers 1 and 4).

Once the Printerface has been set up, it provides the user with 11 printer control registers most of which use the base address which is given on the first screen. The printers characters are obtained from the location VGEN*2048. The first programming difference you might come across between the VIC and

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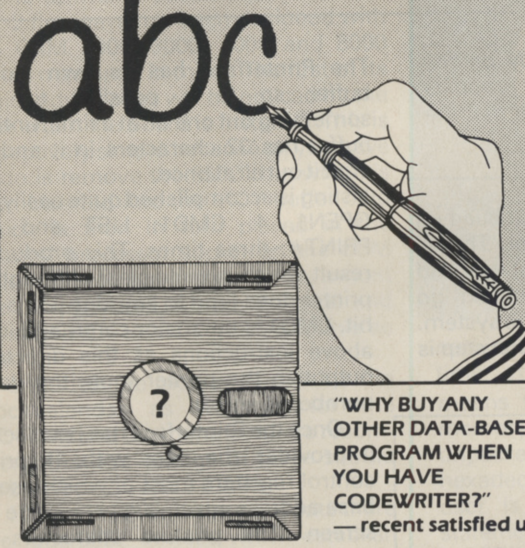

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```
2000 VGEN=BASE+9
9000 REM" INITIALISE
9100 BASE=PEEK(1)+PEEK(2)*256
9110 VCHR=BASE
9120 VDOTS=BASE+1
9130 VFEED=BASE+2
9140 VLEFT=BASE+3
9150 VRIGHT=BASE+4
9160 VWRITE=BASE+5
9170 VQUOTES=BASE+6
9180 VHEIGH7=BASE+7
9190 VINVERSE=BASE+8
9210 VSIZE=BASE+10
9220 TEXT=BASE+16
9230 HIRES=BASE+91:REM"END OF BU
FFER"
9240 SPEED=BASE+285
9250 OUT=BASE+581
9300 REM" HIRES PROGS ONLY
9310 FORX=0TO7:A(X)=2↑(7-X):NEXT
9320 PCHR=PEEK(VCHR):PDOTS=PEEK(
VDOTS)
9330 POKEVCHR,31:POKEVDOTS,8
9490 RETURN
READY.
```

the 64 is when you attempt to get upper and lower case characters. In the case of the VIC, the instruction is POKE VGEN,17 whereas for the 64 it is POKE VGEN,27. If you wish to define your own characters this is done by putting the printer character set in RAM.

Joining lines together is simple with VFEED,0 and giving the printouts more room is simply a matter of VFEED,8.

When in the hi-res mode, the areas used can coincide and the VIC/64 will probably crash. This situation can be avoided by allocating the hi-res areas before running the printerface program. This is accomplished by typing Graphic 2: Graphic 0. Should you want printerface with a given hi-res program all you need to use is POKE55,X:POKE56,Y which allocates the graphic space. Using the RUN/STOP – RESTORE key is a little dangerous as it might disable the printerface.

Price of the printerface (including p and p) £20.95. Price of the whole printer system £71.95.

Product:	*Printerface*
Area:	*Interfacing*
Configuration:	*VIC or 64, television or monitor, ZX and VIC/64 power supply, cassette deck, ZX (or Alphacom 32) printer, Printerface.*
Company:	*Softex Computers*
Address:	*37 Wheaton Road,* *Bournemouth* *BH7 6LH*
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INTERFACING

CONNECTING CBM/PET/VIC/64 THROUGH THE USER PORT

This is the third in a series of practical DIY articles by Owen Murcott about how to connect two Commodore computers through their user ports. Owen, an independent consultant, acquired his first Commodore computer over five years ago. The articles are based on his experience and in this one he gives you some programs which use the principles described in the first two.

Recapitulation

In the first article I showed you how to make and wire up a connector to link any two Commodore machines through their user ports. It may be that you missed that article. If so, then note that the principle is to join pins A, C-L and N on both machines, and cross-connect B to M and M to B to provide the handshake link. (These letters are the ones used in all Commodore manuals to refer to the user port pins.) You need two edge connectors, joined by a screened multi-core cable.

The second article described how handshaking works. I gave you the register addresses to PEEK, and the numbers to POKE to get the machines to communicate. Its example program held the register addresses and values in DATA statements. I have used the same idea in two of the three example programs included in this article. This part of their text is compressed slightly, but because you saw it last month the numbers need no explanation.

Flexible programs

I have used plenty of REM statements to guide you through the three programs. Rather than provide a version of each program for each possible machine, I have written them so that they work on any machine. Each includes the coding for master and slave. This means that I have had to include coding which is redundant in each machine, but gives much greater flexibility.

This use of variables which are set at run time, according to machine type, is an old programming trick. It can be particularly useful on the VIC. Some programs won't work on it, if extra memory is connected, because they POKE to screen locations. The screen RAM normally resides in one of three different locations. Its start address depends on memory size. You can modify such programs to use this technique. They will then work on any size VIC. Just test memory size first and set a variable to have the start-of-screen address appropriate to that size. Alternatively, you can first PEEK at location 648, mentioned later, which gives the HI byte of the start-of-screen address. Then multiply by 256 and put it in your start-of-screen variable. Use this variable instead of absolute locations for the POKE command addresses.

Test your reactions

My 'HANDSHAKER' program simply uses the principles of handshaking, and does not use the eight data connectors, C-L. Its start (lines 20-95) is identical to last month's Keyboard Connector program.

In a TV panel game, whoever presses the button first 'lights the lamp.' This question of "who was first?" can be quite a problem. It governs priorities between two machines linked as equal partners. If there is a clash, one of them must give way. A future article will show you how to handle it.

You can use this program to have a competition on reaction time. LOAD and RUN it in both machines and at an agreed signal, press a key. Whoever is the fastest is the winner.

BASIC instructions take an appreciable number of milliseconds to execute. The minimum reliable resolution of the program is the time taken to get a keypress, to send a handshake signal and to get the handshake flag. I estimate this to be 8-12 milliseconds. Assembler could be up to 200 times faster but I think that BASIC is fast enough!

PEEK and POKE bytes

My 'PEEKER/POKER' program enables you to POKE bytes to the other machine, and to PEEK at bytes in it. LOAD and RUN it in both machines. Then select which is to be the master (can be either of them).

Each time that it signals the slave machine, the master transmits the following three- or four-byte header:

- ✻ 1-byte code to signify POKE and PEEK: 'P' to POKE into the slave's memory; Shifted 'P' to PEEK at it;
- ✻ 2-byte address in the slave's memory: LO byte first in order to be consistent with Assembler usage;
- ✻ 1-byte value to be poked if the transmission code was 'P', (signifying POKE).

If the slave machine is told to PEEK (shifted 'P') it responds with a single byte value and a handshake signal. Otherwise, there is no need for a reply on the data link. It just sends a handshake signal to say it has done the POKE and is ready for the next command.

To make yourself known

The start of PEEKER/POKER (lines 20-95) is the same as HANDSHAKER. The master machine, when selected, transmits two PEEK commands (lines 210-223) and addresses the slave's ROM locations 65534 and 65535. The result of the PEEKs enables it to determine the type of slave machine connected. The slave responds (lines 500-522) with the byte from each of these locations. These bytes are pointers to the IRQ (interrupt ReQuest) routines elsewhere in ROM and are unique to each machine. So they identify it when they are put together. You will see that they are also used (line 60) to select the register values at the start. Table 1 gives you their PEEK values.

Table 1

	LO	HI	HEX	DEC
✻BASIC 1 (PET old ROM)	0	0	$0000	0
✻BASIC 2 (Upgrade ROM and 302)	27	230	$E616	58907
✻BASIC 4 (4032 and 8032)	66	228	$E442	58434
✻VIC	114	255	$FF72	65394
✻Commodore 64	72	255	$FF48	65352

The master prints the slave's identification for confirmation (lines 230-250). It then transmits a POKE command to identify itself (lines 300-310) to the slave. The POKE address is the start of the slave's cassette buffer. It is deduced by the master (line 232, line 240) according to the type of slave machine connected. The 1-byte code to be poked could be kept in the cassette buffer location for later use. For now, the slave just pokes to the buffer, (lines 600-602), prints the identification code to the screen, and ends.

So this program demonstrates the use of PEEK and POKE on the data link. As written, it merely enables each machine to identify itself to the other. This is an important feature in the User Port Operating System, mentioned later.

Also POKE to the screen

Now here is a suggested experiment for you to try. Modify the master portion of the PEEKER/POKER program so that the identification code trasmitted at the end is poked directly to the slave screen and not to the cassette buffer. It must work, whatever slave is connected. You can do it by altering the values assigned to variables CL and CH in lines 232 and 240:

- The PET screen RAM is fixed at location 32768. If the slave is a PET, then CH=128.
- VIC and Commodore 64 can have their screens anywhere. If one of these is the slave, the master program first needs to PEEK at slave location 648. This location contains the HI byte of the start address of the screen memory. So the slave will give the master the correct value to use for CH. You could insert the extra PEEKs between lines 250-300.
- CL should always be zero, whatever screen address applies to the slave machine.

Transfer BASIC program

There are occasions when it is useful to be able to transfer a BASIC program from one machine to another. It might be that you want to avoid continually having to disconnect the tape deck or disk drive from one of them; another reason might be that the disk drive or printer will only suit one of the machines. The routine I have given transfers BASIC text from one machine to the other. It saves a lot of error-prone retyping.

Commodore BASIC programs normally start at a fixed location – different for each machine. The receiver's start-of-BASIC may be at a different location from the transmitter's. The receiver program therefore re-calculates the link addresses between BASIC lines when transmission is complete. A machine code program will be spoilt by this re-linking if you transfer it with my routine. (I will give a memory transfer routine to handle machine code transfers in a future article.)

The loader

You could not easily run a PROGRAM TRANSFER communications program written in BASIC. The receiver version would be obliterated by the text of any BASIC program transferred. I have therefore written it in Assembler, and given you a loader for hexadecimal machine code contained in DATA statements. As written, it loads the machine code out of the way at the end of the memory, occupying just 164 bytes. If you are using an un-expanded VIC, to make it fit you must omit the REM statements for other machines when you type it in. However, do not remove lines 60090, 60190, 60290 as they are used as markers in the DATA statements.

LOAD and RUN the loader in each machine. It first tests for the machine type, (lines 60-66) and skips over machine code lines for other machines. The end-of-memory pointers are reset (lines 100-106) before the machine code is poked into the memory so that it is not obliterated later. The loader calculates the prints (lines 110-112) the two entry points for the machine code routine. Then it pokes (lines 5000-5230) the appropriate machine code routine (lines 60000 onwards) starting 164 bytes before the end of your machine's memory. This takes quite a few seconds.

The machine code is actually relocateable. There is nothing in it which depends on it being loaded to any particular memory location. You can place it elsewhere if you wish, e.g. in the second cassette buffer of a PET, or in the spare RAM at $C000 in the CBM64. The only thing to remember is that the entry point for the transmitter is at the start of the machine code. The entry point for the receiver is four bytes further on.

Sumcheck

If you get an error message during the load, check your typing of the DATA statements. The first number in the group of DATA statements for each machine is a sumcheck (an arithmetic total of the byte values of the machine code routine). The loader calculates the total value of the bytes actually poked and compares it with the sumcheck. If they are different, you probably made a typing error.

Entry points

When the machine code has loaded, make a note of the SYS entry points before you clear the screen. You could then save the machine code with the Machine Language Monitor if you wished.

Now type or load a BASIC program into one of the machines. To transfer it to the other, type a SYS command on each machine to the location given on the screen at the time you ran the machine code loader. Select the transmitter first and then the receiver, otherwise the transmitter will wait for ever for the receiver's first 'READY' signal.

Amazing speed

You will be amazed at this routine's speed. It is 3-4 times faster than a 4040 disk transfer, and about 20 times faster than a 1540 disk transfer. A cassette program which takes 10 minutes to load will transfer in two or three seconds!

Protocol means etiquette

The word 'protocol,' when applied to data transmission, often mystifies people. A dictionary definition of it reads: "The formulary of diplomatic etiquette" (Cassell's English Dictionary). In just the same way, protocols in data transmission are the rules and etiquette for the communications. So the choice of word is a good one.

You must define the significance and sequence of bytes in each transmission from machine to machine. Both machines must obey the same rules. Otherwise they will clash and fail to communicate. Protocol must be observed!

The handshake sequence is part of the protocol. Another part comprises control codes which define the nature of the transmission. The 3-4 byte transmission header in the PEEKER/POKER program is an example of this.

So in this article I have defined a user port protocol. My suggestion for its general form is:

- 1-byte code letter to define the operation. Unshifted means that master transmits data to slave; shifted means that master requests data from slave;
- n-byte block, length depending on code letter, containing addresses and byte count as applicable, PEEKER/POKER did not need a byte count as it transmits one data byte only;
- Data bytes;
- Terminator code, as applicable. The three zero bytes at the end of a BASIC program terminate the PROGRAM TRANSFER routine. In other circumstances, a single zero byte, or a carriage return CHR$(13), could be used. A terminator is not needed if you included a byte count.

UPOS or UPS

A complete data transmission scheme will need to incorporate facilities to:

- Open up and close down the communications link, and establish precedence (to define which machine comes first in case of a clash);
- Print on the other screen and get keypresses from the other keyboard;
- Transfer single bytes, whole blocks of memory, programs and variables;
- Access the other machine's peripherals.

You can see that the PEEKER/POKER program has quite a lot of BASIC just to enable the communication to take place. This kind of housekeeping should be the job of an operating system. Unfortunately, there are no such facilities built in to your machines. So you have to resign yourself to having larger programs, or losing some memory to accommodate an extra program to provide the facilities.

This extra program is the User Port Operating System. It has additional commands for BASIC, in just the same way that DOS has its own commands. I call mine 'UPOS' (or, for short, 'UPS') and will describe it in a future article.

Different makes of microcomputer

For next month I have planned a digression on how to connect a BBC microcomputer and a Commodore computer through their user ports. This article will also give general guidance on connecting machines of other makes. But if any of your friends owns a BBC micro, tell them to look out for the article. It will show them how to connect two BBC micros together, and as far as I know, this information is not widely available.

Next month – connecting a BEEB

Future articles will return to Commodore machines and will cover how to: swap variables and blocks of memory between machines, open up communications and establish precedence. Later I will cover polling and the use of interrupts, leading to a description of UPS.

```
10 REM          HANDSHAKER                              W.OWEN MURCOTT JULY 1983
11 REM--------------------------------------------------------------------------
20 REM                                              REGISTER ADDRESSES AND VALUES
21 :
30 DATA 59457,59459,59467,59468,59468,59468,59457,59469,254,224,224,223,2
40 DATA 37136,37138,37147,37148,37148,37148,37136,37149,239,224,224,223,16
50 DATA 56577,56579,00828,00828,56578,56576,56589,56589,0,4,4,251,16
52 REM--------------------------------------------------------------------------
60 MT=PEEK(65534)+256*PEEK(65535): REM                        DETECT MACHINE TYPE
61 IF MT=65394 THEN FOR I=1 TO 13: READ Z: NEXT: GOTO 70: REM            IT'S VIC
62 IF MT=65352 THEN FOR I=1 TO 26: READ Z: NEXT: REM                   IT'S CBM64
63 REM                                                         ALL OTHERS ARE PET
64 REM--------------------------------------------------------------------------
70 READ DR,DD,AC,PC,HE,HS,HT,IC: REM                    SET UP REGISTER ADDRESSES
80 READ K1,K2,K3,K4,K5: REM                             SET UP REGISTER VALUES
81 REM--------------------------------------------------------------------------
90 POKE AC,0: REM                              DISABLE AUXILIARY CONTROL FUNCTIONS
91 POKE PC, PEEK(PC) AND K1: REM               SET HANDSHAKE = 1-0
92 POKE HE, PEEK(HE) OR K2: REM                ENABLE HANDSHAKE
93 Z=PEEK(HT): REM                             ENSURE HANDSHAKE BIT IS CLEAR
94 POKE HS, PEEK(HS) OR K3: REM                SEND FIRST HANDSHAKE = 1
95 REM--------------------------------------------------------------------------
100 HO=PEEK (HS) AND K4: REM                          READY TO SEND HANDSHAKE = 0
110 IF (PEEK(IC) AND K5) THEN PRINT "LOSER": END: REM       OTHER HAS SIGNALLED
120 GET Z$: IF Z$="" GOTO 110
130 POKE HS,HO: H=PEEK (IC): REM              SEND SIGNAL AND CHECK OTHER MACHINE
140 IF (H AND K5) THEN PRINT "LOSER": END
150 PRINT "WINNER"
```

```
10 REM          PEEKER/POKER                            W.OWEN MURCOTT JULY 1983
11 REM--------------------------------------------------------------------------
20 REM                                              REGISTER ADDRESSES AND VALUES
21 :
30 DATA 59457,59459,59467,59468,59468,59468,59457,59469,254,224,224,223,2
40 DATA 37136,37138,37147,37148,37148,37148,37136,37149,239,224,224,223,16
50 DATA 56577,56579,00828,00828,56578,56576,56589,56589,0,4,4,251,16
52 REM--------------------------------------------------------------------------
60 MT=PEEK(65534)+256*PEEK(65535): REM                        DETECT MACHINE TYPE
61 IF MT=65394 THEN FOR I=1 TO 13: READ Z: NEXT: GOTO 70: REM            IT'S VIC
62 IF MT=65352 THEN FOR I=1 TO 26: READ Z: NEXT: REM                   IT'S CBM64
63 REM                                                         ALL OTHERS ARE PET
64 REM--------------------------------------------------------------------------
70 READ DR,DD,AC,PC,HE,HS,HT,IC: REM                    SET UP REGISTER ADDRESSES
80 READ K1,K2,K3,K4,K5: REM                             SET UP REGISTER VALUES
81 REM--------------------------------------------------------------------------
90 POKE AC,0: REM                              DISABLE AUXILIARY CONTROL FUNCTIONS
91 POKE PC, PEEK(PC) AND K1: REM               SET HANDSHAKE = 1-0
92 POKE HE, PEEK(HE) OR K2: REM                ENABLE HANDSHAKE
```

```
93 Z=PEEK(HT): REM                         ENSURE HANDSHAKE BIT IS CLEAR
94 POKE HS, PEEK(HS) OR K3: REM            SEND FIRST HANDSHAKE = 1
95 REM------------------------------------------------------------------------
100 PRINT "PRESS M=MASTER S=SLAVE"
101 GETZ$
102 IFZ$="M" GOTO 200
103 IFZ$="S" GOTO 500
104 GOTO 101
105 REM-----------------------------------------------------------------------
200 REM                                                                 MASTER
210 B=208: GOSUB 3000: REM                 SEND SHIFTED 'P' = PEEK
211 B=254: GOSUB 3000: REM                 SEND LO ADDRESS
212 B=255: GOSUB 3000: REM                 SEND HI ADDRESS $FFFE
213 GOSUB 4000: AL=Z: REM                  GET FIRST BYTE
214 :
220 B=208: GOSUB 3000: REM                 SEND SHIFTED 'P' = PEEK
221 B=255: GOSUB 3000: REM                 SEND LO ADDRESS
222 B=255: GOSUB 3000: REM                 SEND HI ADDRESS $FFFF
223 GOSUB 4000: AH=Z: REM                  GET SECOND BYTE
224 :
230 MC=AL+256*AH: REM                      DETERMINE SLAVE MACHINE TYPE TO SET
231 REM                                    LO/HI ADDR OF ITS CASSETTE#1 BUFFER
232 CL=122: CH=2: REM                                                    $027A
233 IF MC=0 THEN B$= "OLD PET": GOTO 250
234 IF MC=58907 THEN B$= "BASIC 2": GOTO 250
235 IF MC=58434 THEN B$= "BASIC 4": GOTO 250
236 :
240 CL=60: CH=3: REM                                                     $033C
241 IF MC=65394 THEN B$= "VIC": GOTO250
242 IF MC=65352 THEN B$= "COMMODORE 64": GOTO 250
243 PRINT "MACHINE NOT KNOWN": END
244 :
250 PRINT "SLAVE MACHINE IS "B$
251 :
300 B=80 :GOSUB 3000: REM                  SEND 'P' = POKE
301 B=CL: GOSUB 3000: REM                  SEND LO ADDRESS
302 B=CH: GOSUB 3000: REM                  SEND HI ADDRESS
303 IF MT=0 THEN B=0: GOTO 310
304 IF MT=58907 THEN B=1: GOTO 310
305 IF MT=58434 THEN B=2: GOTO 310
306 IF MT=65394 THEN B=3: GOTO 310
307 IF MT=65352 THEN B=4: GOTO 310
310 GOSUB 3000: END: REM                   SEND MACHINE TYPE CODE
499 REM-----------------------------------------------------------------------
500 REM                                                                  SLAVE
510 GOSUB 4000: C=Z: REM                               GET TRANSMISSION CODE
511 IF C<>80 AND C<>208 THEN PRINT"?BAD CODE " CHR$(C): END
512 GOSUB 4000: AL=Z: REM                              GET ADDRESS LO
513 GOSUB 4000: AH=Z: REM                              GET ADDRESS HI
514 IF C=80 GOTO 600: REM                              'P' = POKE
515 :
520 B=PEEK(AL+256*AH): REM                             PEEK AT THE ADDRESS
521 GOSUB 3000: REM                                    SEND PEEKED VALUE
522 GOTO 500: REM                                      NEXT TRANSMISSION CODE
523 :
600 GOSUB 4000: REM                                    GET VALUE TO POKE
601 POKE AL+256*AH,Z: REM                              POKE IT TO THE ADDRESS
602 PRINT"MASTER POKE"AL+256*AH","Z: END
603 :
999 REM-----------------------------------------------------------------------
1000 IF (PEEK(IC) AND K5)=0 GOTO 1000: REM             AWAIT HANDSHAKE
```

```
1001 RETURN
1002 REM----------------------------------------------------------------------
2000 POKE HS, PEEK(HS) AND K4: REM                      SEND HANDSHAKE = 0
2001 POKE HS, PEEK(HS) OR K3: REM                       SEND HANDSHAKE = 1
2002 RETURN
2003 REM----------------------------------------------------------------------
3000 REM                                      TRANSMITTER
3001 GOSUB 1000: REM                                    WAIT 'READY TO RECEIVE'
3002 POKE DD,255: POKE DR,B: REM                        SEND CHARACTER
3003 GOSUB 2000: REM                                    SEND 'CHARACTER SENT'
3004 RETURN
3005 REM----------------------------------------------------------------------
4000 REM                                      RECEIVER
4001 GOSUB 2000: REM                                    SEND 'READY TO RECEIVE'
4002 GOSUB 1000: REM                                    WAIT 'CHARACTER SENT'
4003 POKE DD,0: Z=PEEK(DR): REM                         GET CHARACTER
4004 RETURN
READY.
```

```
10 REM          PROGRAM TRANSFER                       W.OWEN MURCOTT JULY 1983
11 REM----------------------------------------------------------------------
60 MT=PEEK(65534)+256*PEEK(65535): REM                      DETECT MACHINE TYPE
61 IF MT=0 THEN SL=132: ML=134: DL=142: GOTO 100: REM                    BASIC1
62 GOSUB 1000: IF MT=58907 THEN SL=48: ML=52: DL=60: GOTO 100: REM       BASIC2
63 GOSUB 1000: IF MT=58434 THEN SL=48: ML=52: DL=60: GOTO 100: REM       BASIC4
64 GOSUB 1000: IF MT=65394 THEN SL=51: ML=55: DL=63: GOTO 100: REM          VIC
65 GOSUB 1000: IF MT=65352 THEN SL=51: ML=55: DL=63: GOTO 100: REM        CBM64
66 PRINT "MACHINE NOT KNOWN": END
67 REM                                      SL - POINTER TO END OF STRINGS
68 REM                                      ML - POINTER TO MEMORY LIMIT
69 REM                                      DL - POINTER TO DATA LINE NUMBER
70 REM----------------------------------------------------------------------
100 Z=PEEK(ML)+256*PEEK(ML+1): REM          ADDRESS OF END OF MEMORY
101 Z=Z-164: REM                            MACHINE CODE IS 164 BYTES LONG
102 A=INT(Z/256): REM                       NEW HI ADDRESS
103 B=Z-256*A: REM                          NEW LO ADDRESS
104 POKE SL,B: POKE SL+1,A: REM             END OF STRINGS
105 POKE ML,B: POKE ML+1,A: REM             MEMORY LIMIT
106 Z$=" "
107 REM----------------------------------------------------------------------
110 PRINT "LOADING MACHINE CODE"
111 PRINT "[D]TO TRANSMIT PROGRAM": PRINT "SYS";Z
112 PRINT "[D]TO RECEIVE PROGRAM": PRINT "SYS";Z+4
113 :
120 GOTO 5000: REM                           LOAD MACHINE CODE
999 REM----------------------------------------------------------------------
1000 READ Z$: IF Z$<>"*" THEN 1000 :REM     SKIP MACHINE CODE FOR LAST M/C
1001 RETURN
5000 REM----------------------------------------------------------------------
5010 REM                                          MACHINE CODE LOADER
5100 H1=Z: READ H3: REM                         SET START & GET SUMCHECK
5110 READ A$: IF A$="*" THEN 5180: REM          GET BYTE & TEST END
5120 IF LEN(A$)<>2 THEN 5200: REM               CHECK LENGTH
5130 A=ASC(A$)-48: A=A+7*(A>9): REM             CONVERT UPPER
5140 IF A<0 OR A>15 THEN 5200: REM              BAD HEXADECIMAL
5150 B=ASC(RIGHT$(A$,1))-48: B=B+7*(B>9): REM   CONVERT LOWER
5160 IF B<0 OR B>15 THEN 5200: REM              BAD HEXADECIMAL
5170 Z=16*A+B: POKE H1,Z: H1=H1+1: H2=H2+Z: GOTO 5110
```

```
5180 IF H2<>H3 THEN 5230: REM                       AT END DO SUMCHECK
5190 END
5200 PRINT "[D]DATA LINE";PEEK(DL)+256*PEEK(DL+1)
5210 PRINT "?BAD BYTE"
5220 PRINT "[D]"A$: END
5230 PRINT "[D]SUMCHECK ERROR": END
5999 REM----------------------------------------------------------------------------------
60000 DATA 23943: REM                                                      BASIC1
60010 DATA A9,FF,D0,02,A9,00,8D,43,E8,78,A9,00,8D,4B,E8,AD,4C,E8,29,FE,8D,4C,E8
60020 DATA AD,4C,E8,09,E0,8D,4C,E8,AD,41,E8,AD,4C,E8,09,E0,8D,4C,E8,A5,7A,85,9D
60030 DATA A5,7B,85,9E,A0,00,A2,00,AD,43,E8,D0,3B,AD,4C,E8,29,DF,8D,4C,E8,09,E0
60040 DATA 8D,4C,E8,AD,4D,E8,29,02,F0,F9,AD,41,E8,91,9D,F0,04,A2,00,F0,05,E8,E0
60050 DATA 03,F0,08,E6,9D,D0,D8,E6,9E,D0,D4,A5,9D,85,7C,A5,9E,85,7D,20,30,C4,58
60060 DATA 4C,70,C7,AD,4D,E8,29,02,F0,F9,B1,9D,8D,41,E8,AD,4C,E8,29,DF,8D,4C,E8
60070 DATA 09,E0,8D,4C,E8,B1,9D,F0,04,A2,00,F0,05,E8,E0,03,F0,D6,E6,9D,D0,D6,E6
60080 DATA 9E,D0,D2
60090 DATA *
60100 DATA 22738: REM                                                      BASIC2
60110 DATA A9,FF,D0,02,A9,00,8D,43,E8,78,A9,00,8D,4B,E8,AD,4C,E8,29,FE,8D,4C,E8
60120 DATA AD,4C,E8,09,E0,8D,4C,E8,AD,41,E8,AD,4C,E8,09,E0,8D,4C,E8,A5,28,85,4B
60130 DATA A5,29,85,4C,A0,00,A2,00,AD,43,E8,D0,3B,AD,4C,E8,29,DF,8D,4C,E8,09,E0
60140 DATA 8D,4C,E8,AD,4D,E8,29,02,F0,F9,AD,41,E8,91,4B,F0,04,A2,00,F0,05,E8,E0
60150 DATA 03,F0,08,E6,4B,D0,D8,E6,4C,D0,D4,A5,4B,85,2A,A5,4C,85,2B,20,42,C4,58
60160 DATA 4C,79,C5,AD,4D,E8,29,02,F0,F9,B1,4B,8D,41,E8,AD,4C,E8,29,DF,8D,4C,E8
60170 DATA 09,E0,8D,4C,E8,B1,4B,F0,04,A2,00,F0,05,E8,E0,03,F0,D6,E6,4B,D0,D6,E6
60180 DATA 4C,D0,D2
60190 DATA *
60200 DATA 22937: REM                                                      BASIC4
60210 DATA A9,FF,D0,02,A9,00,8D,43,E8,78,A9,00,8D,4B,E8,AD,4C,E8,29,FE,8D,4C,E8
60220 DATA AD,4C,E8,09,E0,8D,4C,E8,AD,41,E8,AD,4C,E8,09,E0,8D,4C,E8,A5,28,85,4B
60230 DATA A5,29,85,4C,A0,00,A2,00,AD,43,E8,D0,3B,AD,4C,E8,29,DF,8D,4C,E8,09,E0
60240 DATA 8D,4C,E8,AD,4D,E8,29,02,F0,F9,AD,41,E8,91,4B,F0,04,A2,00,F0,05,E8,E0
60250 DATA 03,F0,08,E6,4B,D0,D8,E6,4C,D0,D4,A5,4B,85,2A,A5,4C,85,2B,20,B6,B4,58
60260 DATA 4C,EC,B5,AD,4D,E8,29,02,F0,F9,B1,4B,8D,41,E8,AD,4C,E8,29,DF,8D,4C,E8
60270 DATA 09,E0,8D,4C,E8,B1,4B,F0,04,A2,00,F0,05,E8,E0,03,F0,D6,E6,4B,D0,D6,E6
60280 DATA 4C,D0,D2
60290 DATA *
60300 DATA 20053: REM                                                         VIC
60310 DATA A9,FF,D0,02,A9,00,8D,12,91,78,A9,00,8D,1B,91,AD,1C,91,29,EF,8D,1C,91
60320 DATA AD,1C,91,09,E0,8D,1C,91,AD,10,91,AD,1C,91,09,E0,8D,1C,91,A5,2B,85,4E
60330 DATA A5,2C,85,4F,A0,00,A2,00,AD,12,91,D0,3B,AD,1C,91,29,DF,8D,1C,91,09,E0
60340 DATA 8D,1C,91,AD,1D,91,29,10,F0,F9,AD,10,91,91,4E,F0,04,A2,00,F0,05,E8,E0
60350 DATA 03,F0,08,E6,4E,D0,D8,E6,4F,D0,D4,A5,4E,85,2D,A5,4F,85,2E,20,33,C5,58
60360 DATA 4C,60,C6,AD,1D,91,29,10,F0,F9,B1,4E,8D,10,91,AD,1C,91,29,DF,8D,1C,91
60370 DATA 09,E0,8D,1C,91,B1,4E,F0,04,A2,00,F0,05,E8,E0,03,F0,D6,E6,4E,D0,D6,E6
60380 DATA 4F,D0,D2
60390 DATA *
60400 DATA 20042: REM                                                       CBM64
60410 DATA A9,FF,D0,02,A9,00,8D,03,DD,78,A9,00,8D,E8,07,AD,E8,07,29,00,8D,E8,07
60420 DATA AD,02,DD,09,04,8D,02,DD,AD,0D,DD,AD,00,DD,09,04,8D,00,DD,A5,2B,85,4E
60430 DATA A5,2C,85,4F,A0,00,A2,00,AD,03,DD,D0,3B,AD,00,DD,29,FB,8D,00,DD,09,04
60440 DATA 8D,00,DD,AD,0D,DD,29,10,F0,F9,AD,01,DD,91,4E,F0,04,A2,00,F0,05,E8,E0
60450 DATA 03,F0,08,E6,4E,D0,D8,E6,4F,D0,D4,A5,4E,85,2D,A5,4F,85,2E,20,33,A5,58
60460 DATA 4C,5C,A6,AD,0D,DD,29,10,F0,F9,B1,4E,8D,01,DD,AD,00,DD,29,FB,8D,00,DD
60470 DATA 09,04,8D,00,DD,B1,4E,F0,04,A2,00,F0,05,E8,E0,03,F0,D6,E6,4E,D0,D6,E6
60480 DATA 4F,D0,D2
60490 DATA *
```

INSIDE BASIC

In this months Inside Basic section, we will be taking a look at the storage of variables in the Commodore Machines memory. It is a very good idea to understand how this is done so that you can make the most of your computer's memory. This is not so important with the 64 or the PET, but on the VIC the need to preserve the memory as much as possible is a very important factor in the writing of your programs. All of the addresses mentioned in this article refer to the VIC-20 because of this but it is just as informative to the 64 or PET owner.

The entire area of memory not used for program storage is available for storage of data. Firstly, it is worth looking at the simplest form of data storage – using data statements. A data statement is stored as part of a program in the Basic text area of memory. The data is accessed by the program using the READ command. Data stored in data statements though can only be added to by adding program lines. Another limitation is that data can only be accessed from data statements in a serial mode. This means that to find one particular item the whole table of data must be read. The pointer to the current data statement is stored in locations 65 and 66 and the data line is 63 and 64. Manipulation of the contents of these locations could provide the user with a means of overcoming the serial search limitation.

Data not stored within the program as data statements, is stored by the program in the area of memory above the Basic text area, as variables. Variables can be divided into two groups. Simple variables of the kind used in the following statement; LET X = 47 where X is a simple variable. Array variables are defined by a DIM statement and contain more than one value. The number of values is determined by the number of elements in the DIM statement. For both groups of variables there are three types of data: – real or floating point numbers – integer numbers – and character or string variables, (where words are being stored rather than numbers).

Simple variables of whatever data type are stored immediately above the Basic program text area at an address pointed to by the contents of locations 45 and 46. The amount of memory used to store these variables depends on the number of variables used by a program. Each variable occupies seven bytes of memory and the next free location in the simple variable storage area is pointed to by the contents of locations 47 and 48.

The array variables are stored above the simple variables and thus start from the location pointed to by 47 and 48. The amount of money used to store the array variables depends on the number of array variables the number of elements in each and the data type of each variable. The end of the storage area used for array variables, which is also the beginning of the unused storage area of memory, is pointed to by locations 49 and 50. Since array variables are stored directly above simple variables, whenever a new simple variable is encountered in a program the operating system shifts the entire array variable storage area up seven bytes in memory, thereby opening up a space to accommodate the new variable. This dynamic re-allocation of data storage space is one of the reasons why a machine code subroutine can not be stored in unused memory space, unless placed above the address stored in the top of memory pointers in locations 55 and 56. The re-allocation of memory space slows down a program since every time a new variable is encountered processing stops while the data is moved. When processing speed is important such as in real time applications, this rather inconsistent variation in speed can be a problem. It is overcome by initialising all the variables – using dummy constants if necessary – at the beginning of the program.

Single value variables are divided into three distinct data types, each being stored in a different format. The only thing all three have in common is that each variable stored requires seven bytes of memory. Both integer and floating point numbers stored as single value variables have both the name and the value stored within the seven bytes allocated to each variable. An integer variable is distinguished from a floating point variable by adding 128 to the ASCII value of the variable name. The formats used are shown in Figure 4. From this, one can see that there is no saving in memory usage by using single value integer variables instead of floating point variables.

When the data being stored consists of a string of alphanumeric characters then the variable is stored using the character format. In this format the data is not stored within the seven bytes allocated for variable storage. What is stored is a pointer to an address in memory where this string of characters is stored. Character strings are in fact stored in an area right at the top of memory and extending downwards towards the area occupied by the array variables. By using this method string variables need not be of a fixed length thereby considerably reducing the amount of memory needed to store them. The format used for a string variable is shown in Figure 5.

Since the number of characters in the string is stored as a single byte it is not possible to have a character string longer than 255 characters. This should be considered when adding two string variables together where both are fairly long. Though the area at the top of memory is allocated for the storage of strings, not all string variables are stored there. Thus all strings defined within the program are retrieved, when required from the program text area. This is done by having the variable address pointers point to the location in Basic text rather than the top of memory. What is stored at the top of memory are calculated string variables. The area of memory occupied by these strings can be determined by looking at the contents of locations 51 and 52 this is the start address of the string area, and 53 and 54 which is the end address.

The three data types encountered as simple single value variables can also be stored as multiple value or array variables. Whereas simple variables of whatever data type all occupy the same amount of memory for each variable, the memory requirement for an array is different for each type of data. An array is stored as; an array header plus a set of elements each roughly corresponding to a simple variable. The array header contains the array name, the number of dimensions in the array, the number of elements in each dimension together with a pointer to the start of the next array. Array headers are the same for all data types. As with simple variables the array data type is coded into the array name. In a floating point array both characters are the normal ASCII code. In an integer array 128 is added to the ASCII value of both characters, and in a character array 128 is added to the ASCII value of the second character only. The general format of an array is shown in Figure 6. Here N is used to designate the last element in an array and corresponds to the value used in the DIM statement at the beginning of the program when the array was initialised. The array header for whatever data type has the format shown in Figure 8.

In a one dimensional array the array header occupies seven bytes, but if two dimensions are specified then an extra two bytes are required to specify the number of elements in that dimension, making the header nine bytes long. Similarly if there are three dimensions it would be eleven bytes long. In a two dimensional array set up by DIM D(A,B) the number of elements in B is stored in bytes 6 and 7 of the header, the number of elemtns in A is stored in bytes 8 and 9. The format for each element in an array is identical since all elements are of the same data type, though the format is different for each data type, these are shown in Figure 9.

NOTE: a negative integer whether in an array or a simple variable is stored as a twos complement number, thus a negative integers cannot exceed 32768.

Programs involving extensive string manipulation can suffer from seemingly inexplicable and often lengthy pauses in their operation. This is caused by an operating system function known as garbage collection. Every time a character string is input or calculated it is stored at the bottom of the character string storage area. If a string A$ is input in a program, and then later another A$ string is input, the second input is not stored on top of the first but at the end of the string storage space, leaving the first string still stored in memory. Obviously if the program involves a fair amount of string manipulation the entire free memory space will become full of string storage, a large proportion of which will be "garbage" i.e. strings no longer required. To avoid running out of memory the system must perform at this point a "garbage collection" routine. Garbage collection reclaims all the unused memory and compacts the string storage at the top of memory. This subroutine which is located at $D526 is lengthy and time consuming especially in large programs and the main reason why such programs execute at a much slower rate than small programs. One can force garbage collection to take place by performing the command FRE (O), which calculates the amount of free memory space, this is useful if you don't want a real time program interrupted by the garbage collection process. Generally the more user memory there is available in the system coupled with extensive string manipulation in a program the longer the delays caused by garbage collection will be.

TABLE OF BASIC POINTERS

POINTERS	VIC	PET	64
Start of Basic	43-44	40-41	43-44
End of Basic/start of Variables	45-46	42-43	45-46
End of Variables/start of Arrays	47-48	44-45	47-48
End of Arrays	49-50	46-47	49-50
Start of Strings	51-52	48-49	51-52
End of Strings	53-54	50-51	53-54
Top of Memory	55-56	52-53	55-56

INTEGER VARIABLES

first second character in variable name (the ASCII value + 128)	high low order byte of binary representation of integer value First bit of hi byte is sign bit	0	0	0

FLOATING POINT VARIABLE

first second character in variable name	binary exponent	binary mantissa in packed BCD giving eight digit precision. First bit of first byte is sign bit.

STRING VARIABLES

first second character in variable name, 128 added to ASCII value of second character only.	number of characters	low high order byte of address where string is stored	0	0

SUBSCRIPTED VARIABLES STORAGE (AN ARRAY)

Array header	Element No. 0	Element No. 1	Element No. 2		Element No. N

ARRAY HEADER

first second characters in array name, plus data type coding if any	low high pointer to first byte of next array	number of dimensions in array	high low number of elements in the last specified dimension of the array	expansion bytes

INTEGER ARRAY ELEMENT

high low order byte of binary integer value

CHARACTER ARRAY ELEMENT

number of characters in string	low high byte of address where string is stored

FLOATING POINT ARRAY ELEMENT

binary exponent plus 129	binary mantissa, first byte bit 7 is used to indicate the sign.

BASIC PROGRAMMING

This month we have two programs both for PET machines. The first is a Pontoon game for the 40 column machine which can easily be converted to work on the 64. The second program is a complete directory listing program that is formatted to work on an 80 column screen but has a printer option that will work on both the 40 column PET and the 64 without changing.

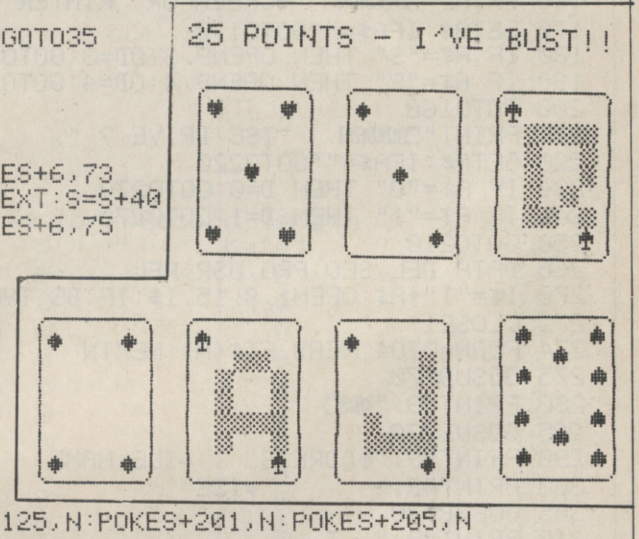
PONTOON

This game was written by Graham Jones who also wrote the game Card Player and the mini word processor for the PET. At this point we must give an apology to all readers who tried entering the Word PET program listed in the July issue. There were two omissions from this article, the first was that of a correct listing. The listing that appeared was of the program as it would appear on an Epsom printer, all of the control characters, like the cursor controls and clear screen characters, either did not show up at all or were displayed as a single number. The second error was an omission of the information that the program has printer commands for an Epsom printer and not for a standard Commodore printer.

Back to the game, you start with $250 and when the cards are dealt, you are asked how much you wish to bet (minimum of $10) after that, your second card is turned over. You may then stick, twist, or buy a card depending on the total of your cards to date. This will continue until either you run out of money or you decide not to play another hand.

The program will not be too difficult to convert to work on the 64. The only things that must be changed are: the variables sp and so should be changed to 1144 and 1584 respectively on line 30, at the end of line 55 add the command GOSUB3000, and enter 3000 FOR I=O TO 999:POKE55296,(colour):NEXT:RETURN

```
 0 REM*** PONTOON BY GRAHAM JONES ***
 1 PRINT"▯":GOTO15
 5 GETA$:IFA$=""THEN5
 10 RETURN
 15 FORI=1TO10:PRINTTAB(15)"▓▓          ":PRINTTAB(15)"▓ PONTOON "
 16 PRINTTAB(15)"▓       ":PRINT"▓▓▓▓▓▓▓▓▓▓▓▓▓"TAB(19)"BY"
 17 PRINT"▓▓▓"TAB(14)"GRAHAM JONES":FORF=1TO250:NEXT
 19 PRINT"▓▓▓"TAB(15)"          "
 20 PRINTTAB(15)" PONTOON ":PRINTTAB(15)"          ▓"
 21 FORF=1TO250:NEXT:NEXTI:PRINT"▯"
 30 DIMFL(52),D%(52):SP=32888:SC=33328:M=250:BM=1000
 33 REM***SHUFFLE & DEAL***
 35 PRINT"SHUFFLING THE PACK"
 38 D=0:Z=1:FORI=1TO52:FL(I)=0:D%(I)=0:NEXT
 40 X=RND(-TI):FORI=1TO52
 45 C%=52*RND(1)+1:IFFL(C%)<>0GOTO45
 48 IFI=48THENPRINT"▓▓▓▓▓▓▓▓▓▓▓NEARLY FINISHED SHUFFLING"
 50 D%(I)=C%:FL(C%)=1:NEXT
 55 PRINT"▯DEALING CARDS":CP=0:PP=0:CT=0:F=0:A=0:RB=0:PF=0:AF=0
 60 S=SP:GOSUB1000:S=SC:GOSUB1000:S=SP+8:GOSUB1000:S=SC+8:GOSUB1000:S=SP
 65 D=Z:GOSUB2000:GOSUB500:PRINT"YOU HAVE $"M"AND"CT;:IFA>0THENPRINT"OR"CT+10;
 66 PRINT"POINTS":PRINT"WHAT IS YOUR OPENING BET  (MIN $10)"
 68 GOSUB602:S=S+8:D=Z+2:GOSUB2000:D=Z+3
 69 REM***FIRST PLAYER'S GAME***
 70 GOSUB500:PRINT"YOU HAVE $"M"AND";
 71 PRINTCT;:IFA>0ANDCT<12THENPRINT"OR"CT+10;
 72 PRINT" POINTS":PRINT"BET,TWIST OR STICK (B,T OR S) ?":GOSUB5
 74 IFA$="B"THENGOSUB600:GOTO80
 75 IFA$="S"THENGOSUB500:GOSUB400:PRINT"TOTAL POINTS "CT:GOTO100
 78 IFA$<>"T"THEN85
 80 IFD<Z+7THENS=S+8:D=D+1:GOSUB1000:GOSUB2000
 85 IFCT>21THENGOSUB500:PRINTCT"POINTS - YOU'RE BUST!":FORI=1TO2000:NEXT:GOTO765
 90 IFD=Z+6ANDCT<22THENGOSUB500:PRINT"FIVE CARD TRICK!!":F=F+1:GOTO100
 95 GOTO70
 98 REM***COMPUTERS REPLY***
 100 FORI=1TO1000:NEXT
 105 S=SC:RT=D:PF=0:PP=CT:CT=0:A=0:D=Z+1:GOSUB2000:S=S+8:D=Z+3:GOSUB2000:D=RT
 110 GOSUB500:PRINT"MY POINTS "CT:FORI=1TO500:NEXT
 115 IFCT<12ANDA>0THENCT=CT+10:AF=1
 120 IFCT=21ANDPF=1ANDD=RTTHENGOSUB500:PRINT"PONTOON":F=F-3:GOTO750
 125 IFD=RT+3ANDCT<22THENF=F-1:PRINT"FIVE CARD TRICK":GOTO750
 128 IFCT>21THENGOSUB500:PRINTCT"POINTS - I'VE BUST!!":GOTO755
 130 IFCT=>PPTHENGOSUB500:PRINT"MY POINTS "CT:FORI=1TO1000:NEXT:GOTO750
 135 IFAF=1THENCT=CT-10:AF=0
 140 S=S+8:D=D+1:GOSUB1000:GOSUB2000:GOTO110
 400 REM***CHECK REPLY ROUTINE***
 405 IFCT<16ANDA=0THENPRINT"NO CHEATING":FORI=1TO1000:NEXT:GOTO70
 410 IFCT<12ANDA>0THENCT=CT+10
 415 IFCT=21ANDD=Z+3ANDPF=1THENGOSUB500:PRINT"PONTOON":F=F+2
 420 RETURN
 500 REM***MESSAGE PAD CLEAR***
 505 PRINT"▒                                    "
 510 PRINT"                                     "
 515 PRINT"                                    ▒";
 520 RETURN
 600 GOSUB500:PRINT"YOU HAVE $"M" WHAT IS YOUR BET":PRINT"(MIN $10) ";
 602 INPUTB:IFB<10ORB>MTHEN610
 605 RB=RB+B:M=M-B:GOSUB500: RETURN
 610 GOSUB500:PRINT"FOOL":FORI=1TO500:NEXT:GOTO600
 750 REM***END GAME***
 755 FORI=1TO1000:NEXT
 760 GOSUB500:CP=CT:PRINT"YOUR POINTS "PP;:IFCP>21THENPRINT"- I BUST!!":GOTO765
 762 PRINT"- MY POINTS "CP
 765 IFCP=>PPANDCP<22ANDF<=0THEN775
 770 PRINT" YOU WIN!! $"RB:M=M+RB+RB:IFF>0THENM=M+RB:BM=BM-RB
 772 IFCP>21ORF>0THENBM=BM-RB:GOTO780
 775 PRINT" I WIN!!!":BM=BM+RB:IFM<10THENPRINT"▒YOUR BROKE▒":GOTO800
 780 FORI=1TO2000:NEXT:GOSUB500:IFBM<10THEN795
 785 GOSUB500:PRINT"YOU HAVE $"M:PRINT"WANT ANOTHER GAME (Y OR N) ?":GOSUB5
 790 IFA$="N"THENPRINT"▒":GOTO800
 793 Z=D+1:IFZ>45ORF>1ORF<-1THENPRINT"RE-";:GOTO35
 794 GOTO55
 795 PRINT"▒YOU HAVE BROKEN THE BANK ▒▒▒"
 800 PRINT"THANKS FOR PLAYING":END
 1000 REM***BLANK CARD DRAW***
 1005 POKES,85:FORI=1TO5:POKES+I,64:NEXT:POKES+6,73
 1010 FORI=1TO7:S=S+40:POKES,93:POKES+6,93:NEXT:S=S+40
 1015 POKES,74:FORI=1TO5:POKES+I,64:NEXT:POKES+6,75
 1020 S=S-320:RETURN
 2000 REM***CARD DRAW DETAIL***
 2005 IFD%(D)<14THENC=14-D%(D):N=83:GOTO2025
 2010 IFD%(D)<27THENC=27-D%(D):N=88:GOTO2025
 2015 IFD%(D)<40THENC=40-D%(D):N=90:GOTO2025
 2020 C=53-D%(D):N=65
 2025 IFC<>2THENPOKES+41,N:POKES+285,N
 2030 IFC>3ANDC<11THENPOKES+45,N:POKES+281,N
 2035 IFC=3ORC=5ORC=7ORC=9THENPOKES+163,N
 2040 IFC=6ORC=7THENPOKES+161,N:POKES+165,N
 2045 IFC=8ORC=9ORC=10THENPOKES+121,N:POKES+125,N:POKES+201,N:POKES+205,N
 2050 IFC=2ORC=10THENPOKES+83,N:POKES+243,N
 2055 IFC>10ORC=1THENPOKES+202,102:POKES+242,102:POKES+245,102
 2060 IFC>10THENPOKES+85,102
 2065 IFC>11THENPOKES+82,102
 2070 IFC=1ORC>11THENPOKES+122,102:POKES+162,102:POKES+204,102
 2075 IFC=1ORC=11ORC=12THENPOKES+125,102:POKES+165,102
 2080 IFC=1ORC=12THENPOKES+83,102:POKES+84,102
 2085 IFC=11ORC=12THENPOKES+243,102
 2090 IFC=1ORC=11THENPOKES+205,102
 2095 IFC=1THENPOKES+203,102
 2100 IFC=11THENPOKES+244,102
 2105 IFC=13THENPOKES+124,102:POKES+163,102
 2110 IFC>10THENC=10:PF=1
 2115 CT=CT+C:IFC=1THENA=A+1
 2120 RETURN
READY.
```



```
25 POINTS - I'VE BUST!!
```

COMPLETE DIRECTORY

This program gives a full directory listing of your disks. The program will display information such as the start track and sector, the size of the file, and the name and file type. The display can be sent to either the screen or the printer and will work on any Commodore disk drive that you have except hard disks.

The display is formatted for an 80 column display for both screen and printer. This means that if you have not got an 80 column PET, the display on the screen will not be very good but the display on the printer will be just as good. This program will therefore work, as it is, on any of the Commodore machines when output to printer but only on 80 column PET's for the video display.

Following the listing is an example printout of the program. 64 and VIC owners with either 1540 or 1541 disk drives will need drive type 1 for their directory.

```
100 REM* FULL DIRECTORY LIST ROUTINE
110 REM  ===========================
120 REM
130 REM BY DIRECT TRACK & SECTOR READING FROM DISC
140 REM
150 BL$="                                    "
151 PRINT"□¬RIVE |YPE:"
152 PRINT"             1: 2040,3040,4040"
153 PRINT"             2: 8050,8250"
154 PRINT"▮   ¬NTER DRIVE TYPE NUMBER ? ";
155 GETA$:IFA$=""THEN155
156 T=18:S=1
157 IF A$="1" THEN 160
158 IF A$="2" THEN T=35:GOTO160
160 PRINT"□▮▮▮▮  ♥CREEN OR ¬RINTER ? ";
170 GETA$:IFA$=""GOTO170
180 IF A$="S" THEN OPEN9,3:OD=3:GOTO210
190 IF A$="P" THEN OPEN9,4:OD=4:GOTO210
200 GOTO160
210 PRINT"□▮▮▮▮  −ISC DRIVE ? ";
220 GETA$:IFA$=""GOTO220
230 IF A$="0" THEN D=0:GOTO270
240 IF A$="1" THEN D=1:GOTO270
250 GOTO210
260 DATA DEL,SEQ,PRG,USR,REL
270 I$="I"+A$:OPEN1,8,15,I$:IF DS THEN ER=5:GOTO720
272 CLOSE1
274 FORN=0TO4:READ FT$(N):NEXTN
275 GOSUB770
280 PRINT#9,"▒▒□                        3* * * –ULL ¬IRECTORY ¬ETAILS * * *■"
285 GOSUB770
290 PRINT#9,"♠DDRESS     –ILE NAME          |YPE    ♥IDE ♥ECTOR  _ECORD LENGTH";
300 PRINT#9,"     ♥IZE"
305 GOSUB770
310 PRINT#9,"  T  S                                  T  S          BYTES   ";
320 PRINT#9,"      BLOCKS"
330 N$=CHR$(0):Q$=CHR$(34)
340 OPEN 2,8,4,"#6":IF DS THEN ER=1 :GOTO720
350 OPEN 15,8,15    :IF DS THEN ER=2 :GOTO720
360 PRINT#9,CHR$(15);
380 PRINT#15,"B-R4"D,T,S :IF DS THEN ER=3:  GOTO720
390 PRINT#15,"B-P4,0"    :IF DS THEN ER=4:  GOTO720
400 GET#2,T$:T=ASC(T$+N$)
410 GET#2,S$:S=ASC(S$+N$)
420 FORI=1TO8    :RC$=""
430 FORJ=1TO30
440 N=I*32-31+J:PRINT#15,"B-P4",N
450 GET#2,A$:IF A$="" THEN A$=N$
460 RC$=RC$+A$
470 NEXTJ
480 FT=ASC(MID$(RC$,1,1))AND 127:FT$=FT$(FT)
490 NT=ASC(MID$(RC$,2,1))
```

```
 500 NS=ASC(MID$(RC$,3,1))
 510 FL$=   MID$(RC$,4,16)
 515 IF FT$="DEL" THEN FL$=""
 520 TS=ASC(MID$(RC$,20,1))
 530 SS=ASC(MID$(RC$,21,1))
 540 RS=ASC(MID$(RC$,22,1))
 550 NB=ASC(MID$(RC$,29,1)+N$)+ASC(MID$(RC$,30,1)+N$)*256
 560 P$=""
 570 P$=P$+RIGHT$(BL$+STR$(NT),3)
 580 P$=P$+RIGHT$(BL$+STR$(NS),3)
 590 P$=P$+"      "+LEFT$(FL$+BL$,18)
 600 P$=P$+ LEFT$(FT$+BL$,10)
 610 P$=P$+RIGHT$(BL$+STR$(ST),3)
 620 P$=P$+RIGHT$(BL$+STR$(SS),3)
 630 P$=P$+RIGHT$(BL$+STR$(RS),14)
 640 P$=P$+RIGHT$(BL$+STR$(NB),15)
 645 GOSUB770
 650 PRINT#9,P$
 660 NEXT I
 670 IF T<>0 GOTO380
 680 CLOSE2
 690 CLOSE15
 700 CLOSE9
 710 PRINT"▒▒":   END
 720 REM* DISC ERROR
 730 REM  ==========
 740 REM
 750 PRINT"¯ISC ERROR ";ER,DS$
 760 STOP
 770 IF OD=4 THEN PRINT#9,"▒";
 780 RETURN
READY.
```

```
Address     File name          Type     Side Sector  Record length         Size
  t  s                                        t   s           bytes         blocks
 19 13      hintsoct           prg       0   0             0                24
 17  0      softwareoct        prg       0   0             0                33
 19  0      basoct             prg       0   0             0                14
 19  4      directory          prg       0   0             0                 8
 26  2      barchart           prg       0   0             0                 4
 19 17      test               seq       0   0             0                 1
 20 10      aa                 seq       0   0             0                10
 20  0      bb                 seq       0   0             0                18
 15  0      cc                 seq       0   0             0                17
 14  1      dd                 seq       0   0             0                19
 15  2      ee                 seq       0   0             0                 9
 22  3      ff                 seq       0   0             0                21
 13  1      gg                 seq       0   0             0                12
 23  0      hh                 seq       0   0             0                18
 12  0      ii                 seq       0   0             0                21
 24  7      jj                 seq       0   0             0                22
 11  0      decode             prg       0   0             0                 1
 16  2      p                  prg       0   0             0                40
 10  1      sg-64              prg       0   0             0                25
 19  8      interpolate        prg       0   0             0                10
  8  0      pie                prg       0   0             0                 3
 26  4      graphic display    prg       0   0             0                 5
 16  4      graphics display   prg       0   0             0                13
 26  9      hires.data         prg       0   0             0                45
 19  8      line               prg       0   0             0                 3
  8  1      basprognov         prg       0   0             0                18
  7  1      busprognov         prg       0   0             0                 5
```

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BASIC PROGRAMMING

For businessmen sales forecasting all too often depends on aids as sophisticated as a crystal ball. We can't promise any magical solution but this program, written by John Consadine, is more reliable than the usual guesswork. The first part of the article looks at the 'what' and 'how' of sales forecasting and is followed by the program.

Why Forecast?

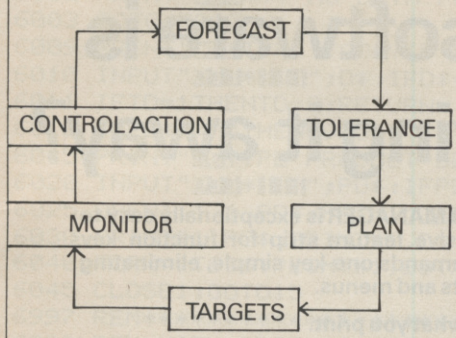
To work effectively and to utilise resources efficiently we need to plan and this means we must have an objective or goal. This will inevitably be set some time in the future and decision has to be taken now on how best to reach it. Such decisions require a forecast.

The sales forecast represents the basic input to many or all of a company's planning areas such as:
production planning and control,
raw materials control,
financial planning and budgeting,
finished stocks control and
all market planning.

Why Monitor?

A forecast will almost inevitably be inaccurate. But the degree of inaccuracy may not be significant as far as reaching the goal is concerned. It is significant a new plan will have to be devised or the target changed. Obviously the flexibility to change the plan depends on how early the significant departure from expectations is detected. Early warning can only be accomplished by monitoring actual events against those forecast.

A typical planning and control cycle, in whatever area, would tend to operate as follows:–



It is obvious that the success of the plan, the likelihood of meeting a target figure, the efficient use of resources and the ability to detect significant deviations from expectations are all directly dependent on the accuracy of the forecast.

The use of computerised data manipulation and analysis would relieve the forecaster of the routine and clerical part of his work, thereby freeing his time for studying in greater depth the more important aspects.

The computerised aid ought to fulfil the following functions:
i) It would allow all relevant data to be stored and retrieved quickly whilst updating on a regular basis.
ii) It would use simple arithmetic procedures for analysing the collected data, quantifying any trends or obvious patterns and projecting these forward to produce forecasts.
iii) It would display the results of such an anlysis succinctly.

Summary

a) We condense the myriad activities which go to make up a sales history e.g. promotions, weather, competitors, strikes, legislation, price rises, working days, market share, into a small number of descriptive values called a model.

b) The elements of the model form a common language in which the regular and predictable aspects of a sales pattern can be quantified. These are level, growth, seasonal indices and predictable adjustments.

c) The computer can be called upon in estimating each aspect separately. The separate estimates can then be recombined to produce a forecast for any future period.

d) Forecasts will be inaccurate due to unpredicable events – noise – and changes in the fundamental sales pattern.

e) The model will be continuously adjusted to ensure that it adapts to any new sales pattern. A process described as 'smoothing'.

Detailed Discussion of the Forecasting Model

a) Level
What is the current average level of sales? The figure which measures where we are now.

There is no method or technique which will tell us exactly. What we have to do is estimate the value in some consistent way from the actual booked order figures as they unfold period by period. In doing so we must allow for the effects of seasonality as well as any particularly unusual events.

One way is to take the average of the last 12 month's booked orders. This has the merit of cancelling out any presumed seasonal effects as well as being very simple to calculate. Such a means of smoothing is sometimes called a Moving Annual Total.

However, the 12 month moving average may be criticised on the following grounds:–
(i) Equal weight is given to each one of the past 12 periods. In a time of change it may be most appropriate to give greater weight to the most recent results.
(ii) Twelve months must pass before the first moving average can be calculated. Therefore this technique cannot be applied to new or changed products.

The Computer Sales Forecasting system employs a method of revising the estimate of current level of orders which is very similar to a 12 month moving average but which corrects the two weaknesses noted above. This technique is known as 'smoothing'.

All that is required to set the forecasting and updating process in motion is a choice of smoothing constant and an initial estimate of the level.

Both the initial estimate of the level and smoothing constant need to be chosen with care if satisfactory system performance is to be achieved.

b) Growth
The concept of level, attempts to measure where the product is now. However, a more complete picture of a product is gained if we also know how its status is changing – if at all. Thus, we introduce the concept of growth which is a measure of how quickly the level is changing and in which direction.

Rather than have to worry about whether or not we have made the correct choice we can allow the computer to adjust the growth factor in much the same way as it does the level. That is, if the system is over-forecasting it reduces the growth, if underforecasting it increases it. This can be achieved by making the adjustment proportional to the error. We, therefore, have a second smoothing constant for growth. This, will, in practice be much smaller than the smoothing constant for level, because it is highly undesirable to have the growth factor changing rapidly period by period.

c) Seasonal Indices
This provides a simple and straightforward means of handling those products which possess a noticeable, seasonal pattern. If we are to make sensible estimates of level and growth it is essential that we correct any seasonality in the data first. That is, we must de-seasonalize the booked order history in order to measure its true trend. The concept of seasonal index allows us to do this. Once again we can update the seasonal indices by supplying smoothing constants in an analogous fashion to the level and growth. Thus the original estimates can be continually refined by the system.

Forecasting Using the Basic Model

The basic model has been developed from the three elements, level, growth,

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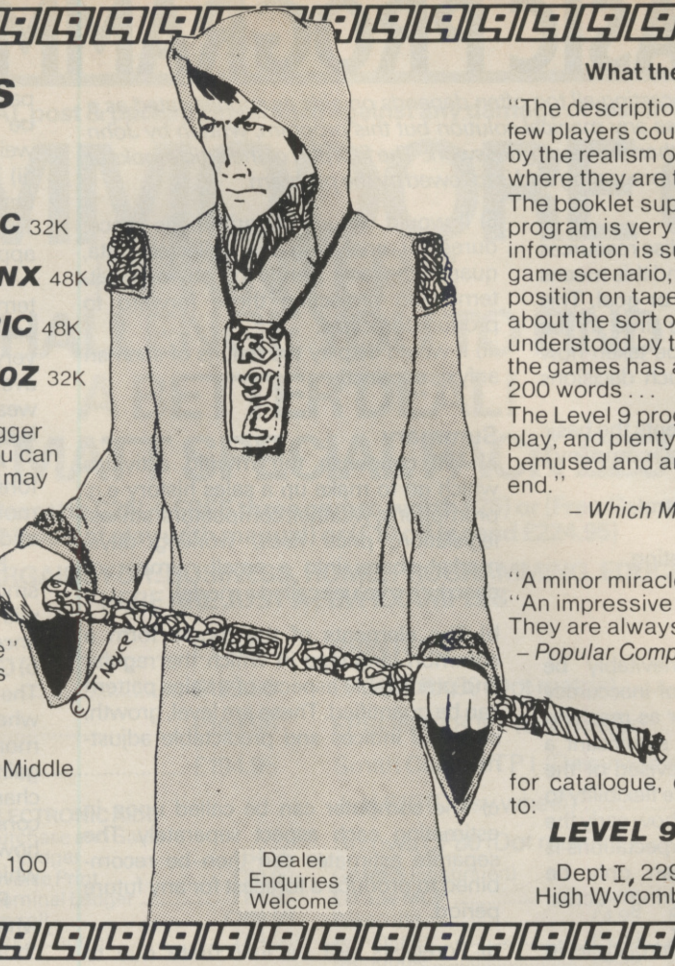

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and seasonal indices. How can we use it to forecast up to say, 12 periods ahead?

If we wish to forecast one period ahead we perform the following calculation.
Level x Growth x Relevant Seasonal Index.

Level x Growth is where we expect the level to be at the end of the next period. The relevant seasonal index then moves this estimate up or down as required.

We would then expect the level to continue changing at the same rate and therefore the second period ahead would be:–
Level x Growth x Growth x Relevant Seasonal Index

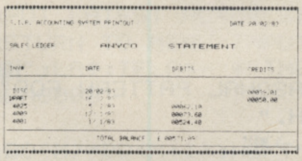
For every additional period ahead we wish to forecast we multiply the level by a further growth factor, before applying the appropriate seasonal index for that month.

It is this continual reappraisal of forecasts that is the great strength of the 'smoothing' technique and has been used successfully even in large industrial mainframe applications.

```
5 REM SALES FORECAST 1
6 REM (C) J.CONSADINE 9/8/83
10 DIMBO(36),E(37),P(36),PP(36),SI(36),PR(12),F(12)
11 DN$="▓▓▓▓▓▓▓▓▓▓▓▓▓"
15 GOSUB30000:GOSUB40000
20 ONAGOTO5000,6000,7000,8000,9000
1040 NEXT
4997 REM****************
4998 REM LOAD FROM TAPE
4999 REM****************
5000 PRINT"▓▓TYPE PRODUCT DESCRIPTION▓":INPUT"▓▓▓*███";PD$
5001 IFPD$="*"THEN5000
5005 IFTE=1THENTE=0:RETURN
5010 PRINT"▓▓▓PLACE DATA TAPE IN CASSETTE & REWIND"
5020 PRINT"▓▓WHEN READY TO LOAD PRESS <SPACE> BAR":GOSUB50000:IFA$<>" "THEN5020
5030 OPEN1,1,0,PD$:PRINT"▓▓"PD$" FOUND"
5040 INPUT#1,PD$:INPUT#1,D$
5050 FORX=1TO36:INPUT#1,BO(X):NEXT
5060 CLOSE1:GOTO15
5997 REM**************
5998 REM-SAVE TO TAPE
5999 REM**************
6000 FL=0:FORX=1TO36:IFBO(X)>0THENFL=FL+1
6001 NEXT:IFFL>0THEN6009
6002 PRINT"▓▓▓*** NO DATA FOUND TO SAVE ***"
6003 GOTO45000
6009 PRINT"▓▓▓TYPE TODAY'S DATE (I.E.**/**/****)"
6010 INPUT"▓▓▓*███";D$:IFD$="*"THEN6009
6011 IFTD=1THENTD=0:RETURN
6012 IFPD$<>""THEN6025
6015 PRINT"▓▓TYPE PRODUCT DESCRIPTION"
6020 INPUT"▓▓▓*███";PD$:IFPD$="*"THEN6015
6025 OPEN1,1,1,PD$:PRINT"▓▓▓WRITING ▓"PD$
6030 PRINT#1,PD$:PRINT#1,D$
6040 FORX=1TO36:PRINT#1,BO(X):NEXT
6045 CLOSE1:GOTO15
6997 REM**********************
6998 REM VIEW PRODUCT HISTORY
6999 REM**********************
7000 IFPD$=""THENTE=1:GOSUB5000
7005 PRINT"▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓PRODUCT HISTORY"
7010 PRINT"▓▓"PD$TAB(30)D$:PRINT"▓"
7020 PRINT"MONTH VOL    MONTH  VOL   MONTH  VOL"
7025 FORX=1TO12
7030 PRINTXTAB(5)BO(X)TAB(13)X+12TAB(19)BO(X+12)TAB(26)X+24TAB(32)BO(X+24)
7040 NEXT:IFFL=1THENRETURN
7050 PRINT"▓▓PRESS ▓SPACE■ FOR MENU OR ▓P■ FOR PRINTER"
7060 GOSUB50000:IFA$=" "THEN15
7070 IFA$="P"THENGOSUB60000:GOTO15
7080 GOTO7060
7997 REM***********************
7998 REM-UPDATE/MODIFY HISTORY
7999 REM***********************
8000 PRINT"▓▓▓▓UPDATE HISTORY WITH LATEST ACTUALS--▓U"
```

```
8001 PRINT"█CHANGE PREVIOUS HISTORY DATA---------█C"
8002 PRINT"█MENU------------------------------------█M"
8003 PRINT"███████████████PRESS OPTION REQUIRED"
8004 GOSUB50000
8010 IFA$="U"THEN8040
8020 IFA$="C"THEN8200
8025 IFA$="M"THENPRINT"█":GOTO15
8030 GOTO8000
8040 PRINT"███INPUT LATEST ACTUALS█"
8050 PRINT"(TO RETURN TO MENU INPUT <M>)"
8060 INPUT"██*███";LA$:IFLA$="*"THEN8040
8070 IFLA$="M"THEN8000
8080 LA=VAL(LA$)
8090 FORX=1TO35:BO(X)=BO(X+1):NEXT
8100 BO(36)=LA:GOTO8040
8200 FL=1:GOSUB7000
8210 PRINT"██WHICH MONTH DO YOU WISH TO CHANGE"
8215 PRINT"(TO RETURN TO MENU INPUT <M>)";
8220 INPUT"██*███";MO$:IFMO$="*"THEN8200
8230 IFMO$="M"THENFL=0:GOTO8000
8240 MO=VAL(MO$):PRINT"█CHANGE TO WHAT(<M> FOR MENU)";
8250 INPUT"██*███";WT$:IFWT$="*"THEN8240
8260 IFWT$="M"THENFL=0:GOTO8000
8270 WT=VAL(WT$):BO(MO)=WT:GOTO8200
8997 REM**********
8998 REM FORECAST
8999 REM**********
9000 MO=36:FG=0:NOD=0:TT=0:GR=0
9001 FORX=1TO36:IFBO(X)>0THENMO=X:X=36
9010 NEXT:IFMO>25THENFG=1
9020 GOSUB30000
9030 IFFG=1THENPRINT"███NOT ENOUGH DATA":PRINT"█DO YOU WANT TO CONTINUE(Y/N)?"
9040 IFFG=1THENGOSUB50000:IFA$="N"THEN15
9050 IFFG=1THENIFA$="Y"THENNOD=1:GOSUB30000:GOTO9070
9060 IFFG=1THEN9000
9070 IFNOD=1THEN9150
9077 REM*********************************
9078 REM AVE LEVEL BASED ON 1ST 12 RESULTS
9079 REM*********************************
9080 FORX=MOTOMO+11:TT=TT+BO(X):NEXT:AL=TT/12
9081 X=MO:E(X)=BO(X)-AL
9082 P(X)=AL+(E(X)*.1):REM ADD 10% OF ERROR
9083 PP(X)=P(X)+(P(X)*(GR/100)*.9):GOSUB10000
9084 FORX=MO+1TO36:E(X)=BO(X)-PP(X-1)
9085 P(X)=PP(X-1)+(E(X)*.1)
9086 PP(X)=P(X)+(P(X)*(GR/100)*.9):GOSUB10000:NEXT
9099 PRINT"██STARTING LEVEL FOR FORECASTING=█"INT(PP(36)+.5)
9100 GOSUB20000
9110 IFA$="A"THEN9170
9120 IFA$="R"THEN9150
9130 IFA$="M"THEN15
9140 PRINT"█":GOTO9070:JC=36
9150 GOSUB30000:INPUT"██STARTING LEVEL██*███";SL$:IFSL$="*"THEN9150
9160 PP(36)=VAL(SL$):IFPP(36)<1THEN9150
9170 GOSUB30000
9174 IFNOD=1THEN9220
9175 PRINT"██FINAL GROWTH=█"GR"█%"
9180 GOSUB20000:IFA$="A"THEN9230
9190 IFA$="R"THEN9220
9200 IFA$="M"THEN15
9210 PRINT"█":GOTO9170
9220 GOSUB30000:INPUT"██FINAL GROWTH(+/-%)";GR
9230 GOSUB30000:IFNOD=1THEN9310
9235 TT=0:FORX=25TO36:TT=TT+BO(X):NEXT:AV=TT/12
```

```
9240 FORX=25TO36:SI(X)=INT((BO(X)*100)/AV):NEXT
9250 PRINT"■■SEASONAL PATTERN"
9260 FORX=25TO36:PRINT"■MONTH■"X-24TAB(12)SI(X):NEXT:GOSUB20000
9270 IFA$="A"THEN9385
9280 IFA$="R"THEN9310
9290 IFA$="M"THEN15
9300 PRINT"■":GOTO9230
9310 PRINT"■":GOSUB30001:PRINT"■INPUT OWN SEASONAL PATTERN FOR"
9320 PRINT"12 MONTHS STARTING WITH NEXT MONTH."
9325 PRINT"■(USE ANY BASE--VOLUMES,%AGES,ETC.)■"
9330 PRINT"■USER'S SEASONAL PATTERN■"
9340 FORX=25TO36:PRINT"■MONTH"X-24;:INPUT"■■*■■■";SI$
9341 IFSI$="*"THENX=X-1:GOTO9346
9345 SI(X)=VAL(SI$)
9346 NEXT
9350 TS=0:FORX=25TO36:TS=TS+SI(X):NEXT:TS=TS/12
9355 FORX=25TO36:SI(X)=INT((SI(X)*100)/TS):NEXT
9360 PRINT"■DO YOU WISH TO REINPUT FIGURES(Y/N)?":GOSUB50000
9370 IFA$="Y"THEN9310
9380 IFA$<>"N"THENPRINT"■■■":GOTO9360
9385 IFPD$=""THENTE=1:GOSUB5000
9386 TD=1:GOSUB6009
9389 PRINT"■"DN$TAB(30)"■DATE"DN$"■■"TAB(29)D$"■"
9390 GOSUB30001:FORX=1TO12:REM-FORECAST
9392 REM****************************
9393 REM-WEIGHTED GROWTH DISCOUNTED
9394 REM****************************
9395 FG=0:F(X)=GR/(100*X):FORA=1TOX:FG=FG+(1+(F(X)/X)):NEXT:FG=FG/X
9399 REM-FORECAST EACH PERIOD
9400 PR(X)=PP(36)*FG*(SI(X+24)/100):NEXT
9410 PRINT"■FORECAST FOR FOLLOWING NEXT 12 MONTHS":T=0:CL=INT(PP(36)+.5)
9420 PRINT"■CURRENT LEVEL"TAB(12)"■"CLTAB(22)"■"PD$
9430 PRINT"GROWTH"TAB(13)"■"GR"■%■":PRINTTAB(20)"■S/INDEX"
9440 FORX=1TO12:PT=INT(PR(X)+.5)
9450 PRINT"MONTH ■"X"■"TAB(12)PTTAB(22)SI(X+24):T=T+PT:NEXT
9460 PRINT"TOTAL(1-12)="TAB(12)T
9470 PRINT"■■TO OVERIDE,INPUT PERIOD TO BE CHANGED"
9480 PRINT"■OR <H> FOR HARD COPY OR <M> FOR MENU";
9490 INPUT"■■*■■■";OP$:IFOP$="*"THEN9490
9500 IFOP$="M"THEN15
9510 IFOP$="H"THEN9600
9515 PE=VAL(OP$)
9520 IFPE<1ORPE>12THEN9490
9530 PRINT"WHAT VALUE IN PERIOD ■"OP$;:INPUTVO
9540 PR(PE)=VO:PRINT"■■";:GOSUB30001:GOTO9410
9597 REM**********
9598 REM HARD COPY
9599 REM**********
9600 IFD$<>""THEN9700
9605 PRINT"■■PLEASE TYPE TODAYS DATE(DD/MM/YY)"
9610 PRINT"■(AND ANY OTHER INFORMATION)":INPUT"■■*■■■";D$
9700 PRINT"■■■■PRINTING"
9710 OPEN128,4,1:SP$="             "
9720 PRINT#128,"-"PD$"-■"
```



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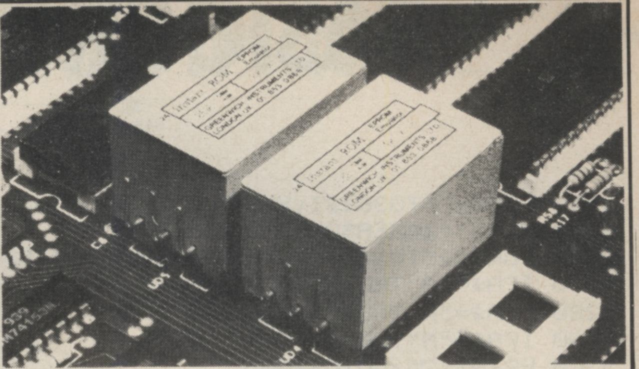

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```
9730 PRINT#128,"█FORECAST FOR 12 MONTHS FOLLOWING ";D$
9740 PRINT#128,"█CURRENT LEVEL  "CL
9750 PRINT#128,"GROWTH        "GR"%█"
9760 PRINT#128,"                 VOLUME             S/INDEX"
9770 FORX=1TO12:V$=STR$(INT(PR(X)+1)):SI$=STR$(SI(X+24)):TL$=STR$(T)
9780 P$=MID$(SP$,1,15-LEN(V$))
9781 VV$=P$+V$:PI$=MID$(SP$,1,14-LEN(SI$)):SS$=PI$+SI$
9782 PT$=MID$(SP$,1,11-LEN(TL$)):TT$=PT$+TL$
9785 M$="MONTH"+STR$(X)
9786 IFLEN(M$)<8THENM$=M$+" ":GOTO9786
9790 PRINT#128,M$;VV$;SS$:NEXT
9795 PRINT#128,"█TOTAL(1-12) "TT$:CLOSE128:GOTO9390
9997 REM******************
9998 REM GROWTH ADJUSTMENT
9999 REM******************
10000 IFE(X)<0THENGR=GR-.5:GOTO10020
10010 IFE(X)>0THENGR=GR+.5
10020 IFGR<-10THENGR=-10
10030 IFGR>10THENGR=10
10040 RETURN
20000 PRINT"███CCEPT,REJECT OR MENU(A/R/M)?":GOSUB50000:RETURN
30000 PRINT"██"
30001 PRINT"██████████████SALES FORECAST 1":RETURN
39997 REM*****
39998 REM-MENU
39999 REM*****
40000 PRINT"██████LOAD PRODUCT HISTORY FROM TAPE  █1"
40010 PRINT"███SAVE PRODUCT HISTORY TO TAPE      █2"
40020 PRINT"███VIEW PRODUCT HISTORY              █3"
40030 PRINT"███UPDATE/MODIFY HISTORY             █4"
40040 PRINT"███FORECAST                          █5"
40050 PRINT"████████PRESS NUMBER FOR OPTION REQUIRED"
40060 GOSUB50000:A=VAL(A$):IFA<1ORA>5THEN40060
40070 RETURN
45000 PRINT"██████████████PRESS ANY KEY FOR MENU":GOSUB50000:GOTO15
50000 GETA$:IFA$=""THEN50000
50010 RETURN
59997 REM*************
59998 REM SCREEN DUMP
59999 REM*************
60000 OPEN3,3,0:OPEN128,4
60010 IF(PEEK(59468)AND14)=14THENCC$=CHR$(17)
60020 FORI=32768TO33700STEP40
60030 IFPEEK(I)=32THENPOKEI,96
60040 OPEN6,4,6:PRINT#6,CHR$(18)
60050 FORI=1TO24:PRINT"█";:IFI=1THEN60070
60060 FORJ=1TOI-1:PRINT:NEXT
60070 INPUT#3,A$:PRINT#128,CC$;A$:NEXT
60080 CLOSE3:CLOSE128:CLOSE6:RETURN
```

HINTS & TIPS

Screen Dump

To start off in this months section, here is a screen dumping routine that will work on all machines. The main principles of this routine are to open the screen as an input channel, position the cursor over the line, input the whole line and output it to printer. The routine takes into account whether the screen is in upper case or lower case. Reverse field characters will appear as normal characters on output and the bottom line is not dumped as this will cause the screen to scroll up one line.

The routine is set up for the PET machines but with one change will work on the 64 and with two changes will work on the VIC.

Firstly the change for the 64. Change line 63020 to:

```
63020 IF(PEEK(53272)AND23)=23THENCC$=CHR$(17)
```

The two changes for the VIC are:

```
63020 IFPEEK(36869)=242THENCC$=CHR$(17)

63030 FORI=1TO22:PRINT"■";:IFI=1THEN63100
```

```
63000 OPEN3,3,0:OPEN128,4
63010 OPEN6,4,6:PRINT#6,CHR$(16)
63020 IF(PEEK(59468)AND14)=14THENCC$=CHR$(17)
63030 FORI=1TO24:PRINT"■";:IFI=1THEN63100
63040 FORJ=1TOI-1:PRINT:NEXT
63100 INPUT#3,A$:PRINT#128,CC$,A$
63110 NEXT:CLOSE6:CLOSE128:CLOSE3:CC$="":RETURN
```

Text Scrolling

A modification of the last routine can allow text to be scrolled off the top of the screen and back on to the bottom by inputing the top line each time and printing it at the bottom of the screen causing the screen to scroll one line.

This works very well except for the colours and reverse characters. Also, leading spaces on the line are ignored unless the leading space is a SHIFT/SPACE. All spaces following that are accepted. Any characters following a ';' will also be ignored so they must not appear.

```
63000 OPEN3,3,0
63010 FORI=1TO1000:PRINT"■";
63020 INPUT#3,A$:PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒";A$
63030 NEXT I
63040 CLOSE3:RETURN
```

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HINTS & TIPS

2 Byte Poke

I have always found it rather annoying having to split a two byte number up to poke away as a pointer. This I have had to do fairly often with the Basic pointers etc. and it meant typing: POKElo,noAND255:POKEhi,no/256. Where hi=lo+1. I decided that it would be very nice if we could have a single routine that would poke the whole number no into the two addresses just giving the value of lo. Hence the next routine that does just that.

The equivalent command would be: SYS(49408),lo,no. This means that the value no can be in the range 0-65535 and lo in the range 0-65534. The number is entered in low-high order.

ROM routines used are the scan past coma, type match check, and get 2 byte parameter.

```
READY.

10 I=49408
20 READA:IFA=-1THEN50
30 POKEI,A:I=I+1
40 GOTO20
50 PRINT"⊐TRY IT TO SEE":END
100 DATA32,253,174,32,138,173,32
110 DATA247,183,165,20,133,87,165
120 DATA21,133,88,32,253,174,32
130 DATA138,173,32,247,183,160,0
140 DATA165,20,145,87,160,1,165
150 DATA21,145,87,96,-1
READY.
```

Restore To Line

In the August edition of Commodore Computing International, there appeared a program called the personal information storage program. One of the Basic routines incorporated in that program was to restore the data to a given line number. This was done so that not all of the data needed reading to get to the information required. The routine was fairly effective but was slow when there were a lot of addresses stored in the program.

This routine is a very useful routine that allows you to restore the data to a given line number. The routine is in machine code and is called by SYS(49152), lineno. Where lineno is any line number in the program. There does not have to be a data statement on the line in question but there must be a line there as if there is not a line, the error message ?UNDEF'D STATEMENT ERROR IN xxx will appear and the running of the program will halt. The program is written to run on the 64 but should run on the VIC or the PET with a little changing.

The Basic ROM routines used are as follows:

$AEFD – Scan past a comma.
$AD8A – Type Match Check.
$B7F7 – Get 2 byte number from input line and store in $14-$15.
$A437 – Print Error Message (number 17).

```
READY.

10 I=49152
20 READA:IFA=-1THEN50
30 POKEI,A:I=I+1
40 GOTO20
50 PRINT"⊐TO TEST IT :"
60 SYS49152,1030
70 READA$:PRINTA$;" ";
75 SYS49152,1000
76 READA$:PRINTA$;" ";
77 SYS49152,1020
78 READA$:PRINTA$;" ";
79 SYS49152,1010
80 READA$:PRINTA$
90 END
100 DATA32,253,174,32,138,173,32
110 DATA247,183,165,20,133,63,165
120 DATA21,133,64,169,0,133,87
130 DATA169,8,133,88,160,3,177
140 DATA87,197,63,208,17,160,4
150 DATA177,87,197,64,208,9,165
160 DATA87,133,65,165,88,133,66
170 DATA96,160,4,177,87,197,64
180 DATA144,13,208,39,160,3,177
190 DATA87,197,63,144,3,76,99
200 DATA192,160,2,177,87,133,90
210 DATA160,1,177,87,133,89,56
220 DATA165,89,233,1,133,87,165
230 DATA90,233,0,133,88,76,25
240 DATA192,162,17,76,55,164,-1
1000 DATA HAS
1010 DATA FINE
1020 DATA WORKED
1030 DATA IT
READY.
```

HINTS & TIPS

Print At

Have you ever wanted to be able to print to the screen at a specified Y,X character position? Some of the home computers on the market have such a command already built in but unfortunately the Commodore computers are not one of these types. Following is a machine code routine written for the 64, set up as a Basic loader that does just that.

The routine is called by SYS 49264,Y,X, any text you require. It positions the cursor to the required position on the screen where 0,0 is top left. If the X value is outside of the range of 0-39 or the Y value is not 0-25, an illegal quantity error will be displayed. In the y values, 0-24 are on the screen but 25 will scroll the screen once before displaying. Once the cursor has been positioned, the routine does a jump to the Basic ROM's perform Print routine to read the text and print it.

The Basic ROM routines used are as follows:

$B7F1 – Scan past a comma and get a one byte parameter.
$B248 – Display illegal quantity error.
$AEFD – Scan past a comma.
$AAA0 – perform PRINT.

Also one Kernal routine was used:

$E716 – Output to screen.

```
READY.

10 I=49264
20 READA:IFA=-1THEN50
30 POKEI,A:I=I+1
40 GOTO20
50 PRINT"□":SYS49264,12,0,"THIS TEXT
   SHOULD BE IN THE MIDDLE OF THESCREEN"
60 END
100 DATA32,241,183,134,87,32,241
110 DATA183,134,88,224,40,176,6
120 DATA165,87,201,26,144,3,76
130 DATA72,178,32,102,229,165,87
140 DATA240,9,169,17,32,22,231
150 DATA198,87,208,247,165,88,240
160 DATA9,169,29,32,22,231,198
170 DATA88,208,247,32,253,174,76
180 DATA160,170,-1
READY.
```

Memory Save

This next routine allows the user to save off any area of memory rather than just the basic programming memory. Monitor that are available do allow the saving off of memory, but if you have not got a monitor, it is a rather awkward thing to do. With this routine, all that you need to know are the start address and the end address+1. The routine is again written for the 64 and is in the form of a Basic loader but with a little changing all work on the VIC. There is no need for this routine on the PET machines as they already have a monitor built in to them. The routine is called by: SYS49328,stad,enad, "filname"[,dev]. Where stad is the start address, enad is the end address+1 and dev is the device number (1 is default).

The routine saves off the present basic pointers, inputs the values and puts them straight into the Basic pointers, calls the save routine, then restores the original basic pointers.

ROM routines used are as follows:

$AEFD – Scan past comma.
$AD8A – Type match check.
$B7F7 – Get two byte parameter.
$E156 – Perform SAVE.

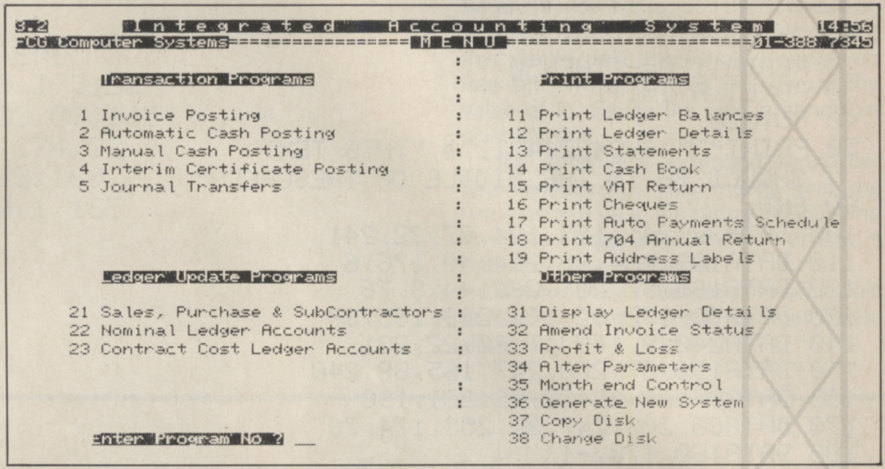
It must be noted that memory saved in this way must be loaded as: LOAD"filename",1,1 or LOAD"LOAD"filename",8,1 depending on whether the program was save on tape or disk.

```
READY.

10 I=49328
20 READA:IFA=-1THEN50
30 POKEI,A:I=I+1
40 GOTO20
50 PRINT"□DO YOU WISH TO SAVE THE MACHINE CODE ?"
60 GETA$:IFA$<>"Y"ANDA$<>"N"THEN60
70 IF A$="N"THENEND
80 SYS49328,49328,49401,"@0:MSAVE",8
90 END
100 DATA165,43,133,87,165,44,133
110 DATA88,165,45,133,89,165,46
120 DATA133,90,32,253,174,32,138
130 DATA173,32,247,183,165,20,133
140 DATA43,165,21,133,44,32,253
150 DATA174,32,138,173,32,247,183
160 DATA165,20,133,45,165,21,133
170 DATA46,32,253,174,32,86,225
180 DATA165,87,133,43,165,88,133
190 DATA44,165,89,133,45,165,90
200 DATA133,46,96,-1
READY.
```

MICROS IN CONSTRUCTION

Acceptance of the microcomputer has been a slow process in the Construction Industry, but FCG Computer Systems have developed a specialist integrated Accounting and Payroll package which has been welcomed by all who use it. There are numerous applications available for surveyors, architects, estimators and project planners and some are explained here.



```
3.2          Integrated      Accounting      System           14:56
FCG Computer Systems================= M E N U ======================01-388 7345
                                          :
        Transaction Programs              :          Print Programs
                                          :
      1 Invoice Posting                   :     11 Print Ledger Balances
      2 Automatic Cash Posting            :     12 Print Ledger Details
      3 Manual Cash Posting               :     13 Print Statements
      4 Interim Certificate Posting       :     14 Print Cash Book
      5 Journal Transfers                 :     15 Print VAT Return
                                          :     16 Print Cheques
                                          :     17 Print Auto Payments Schedule
                                          :     18 Print 704 Annual Return
                                          :     19 Print Address Labels
        Ledger Update Programs            :        Other Programs
                                          :
     21 Sales, Purchase & SubContractors  :     31 Display Ledger Details
     22 Nominal Ledger Accounts           :     32 Amend Invoice Status
     23 Contract Cost Ledger Accounts     :     33 Profit & Loss
                                          :     34 Alter Parameters
                                          :     35 Month end Control
                                          :     36 Generate New System
                                                37 Copy Disk
       Enter Program No ? __                    38 Change Disk
```

An example of an Integrated Accounting System, showing Transaction Programs, Ledger Update Programs and Print Programs for F.C.G. Computer Systems.

In recent years software packages have been developed to cover just about every application imaginable. The range and variety is overwhelming and it is sometimes difficult to sort out the good from the bad. Another problem is finding the right package for the task it is needed for. It seems that the established companies with their abundant resource potential, are unwilling to invest money developing specialised software. In theory – software which can be altered to cater for a general market – Insurance brokers, estate and travel agents for instance, will sell in much greater numbers than any specialised package. Resulting of course in a much greater profit. David Keeling, the Installations manager of FCG disputes this. An industry like the construction business has developed so many unique features – their complicated holiday stamp system for instance that no generalised package could possibly suffice. In his experience there is not a marked difference between the price or the profit of generalised and specialised software and in fact a good generalised accounting package made up of three modules: Nominal, Sales and Ledger will come to a price similar to GCG's Integrated Accounting and Payroll. In fact, other than FCG's Integrated Accounting and Payroll David Keeling knows of only two other similar packages. Surely there must be a potential for more good quality packages in specialist areas. In the Civil and Structural engineering field, a generalised package just does not have enough room for its adaption to the uses it will be needed for.

Since FCG started selling their product they have had a lot of success with their products and have installed this system in locations all round the country. David Keeling estimated that only about 5% of their customers did not enthuse. 3% of this amount had not had the system installed by FCG and the other 2% had had trouble with their hardware. This enthusiasm for applications packages by users is typical. In general, site use of computers is at present the exception rather than the rule and this could be due to a fear or ignorance of them. It is well known that people like to stick to the familiar tried and tested method and managers on the construction have always relied on their intuition and experience when making important decisions. However a suitable software package would save them hours of paper work leaving more time for the motivation and management of the site work force and in the event of having to decide the best solution to a problem, could analyse the results of all possible courses of action. Possible implications of a computer in the field are numerous. For instance the information fed into the computer would have to be collected on a systematic and very accurate basis. Any mistakes could result in horrible mistakes especially with the surveying, architectural and estimation packages where an error could result in the wrong construction of a building or bankruptcy for the company!

FCG are one of the few specialist firms dealing in the Construction Business and as already mentioned have developed a package in the Accounting and Payroll field. Bob Gross and Frank Curtis, both with Accounting backgrounds wrote the programs with the aid of the very complicated Builders Manual. They successfully incorporated all the nuances and union rules characteristic of the Building Industry. The package consists of two modules – Accounts and Payroll which can be sold separately, but as they can be integrated they are usually sold together. FCG like to install the system and teach their customers how to use it. To allay any initial fears, David Keeling explained that FCG usually introduce the Payroll system first, as it is easier to get to grips with. In his experience it usually takes about two to three weeks before the users are confident. After that, their previous nervousness has usually gone and their acceptance of the more complicated Accounting Module installed a few weeks after is more rapid than it might have been. Customers who refuse this gentle breaking in, usually take longer to master the process and experience more problems than is normal.

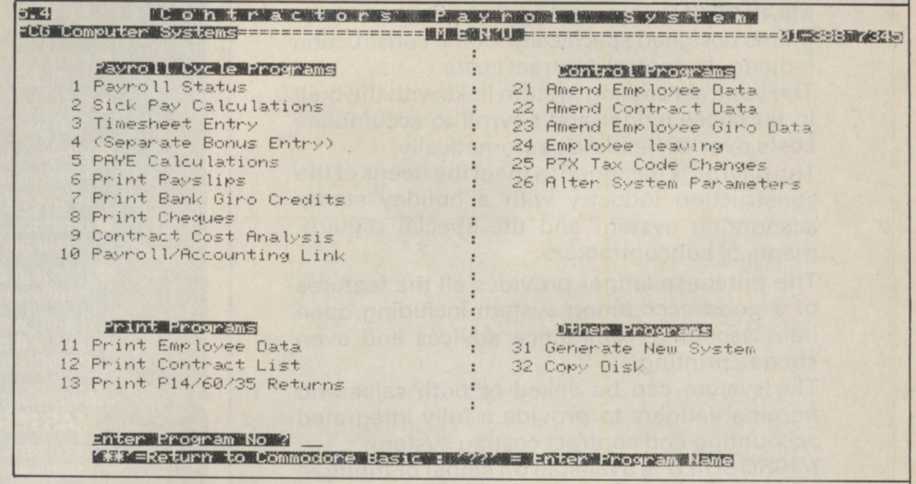
We looked at the Accounting Package first. The program is designed for the non computer user and a lot of care has been taken to make the whole process of changing from program to program as simple and logical as possible. At the start the menu loads and all the programs available, appear listed under their relevant headings. (see picture of Accounting System Menu). To select a program, the relevant number is pressed and then the program takes the user through. Some of the terms may seem fairly confusing or alien, but a simple explanation can settle any query on the program terminology. In the accounting field, information used has always got to be accurate, but on the actual site this is not always so and Site managers, surveyors and other site personnel may experience more problems with the formulating systematic and standardised data the programs need. David Keeling explained that FCG recommends that the firms accountant is present while the system is being introduced so that when there is any auditing to do, he is familiar with the layout and process. His job is made easier as a clear audit trail is provided.

MICROS IN CONSTRUCTION

The Alter Parameter program, present in both programs, is the key to tailoring the system to suit the individual needs of a company. This flexibility seems to be a feature of most of the software packages in the construction field. Programs in the system which cater for the construction industry include the Contract Cost Ledger Accounts for use by subcontractors (keeps track of the material and labour costs; an important requirement in Construction), the Interim Certificate Posting and the Annual Return. When designing a software system for potential use by the computer novice, it is important to consider the interaction between keyboard, the VDU screen and the disks. Information must be portrayed on the screen clearly and concisely. The sales invoice which anticipates every conceivable event likely to occur, includes the contract code, the write off value (a value unique to builders who often have a list of assets which remain unpaid. When they are paid it is known as a write off), the nominal code, the sales amount, discount, VAT. The program needs the answers to these, in order to calculate the invoice and each title is portrayed on the screen with a space for the answer. After processing all the information entered, a print out is produced, resembling a normal invoice. This can then be filed in the office filing system like the more familiar invoice.

The Automatic Cash Payments program saves a lot of time. At the end of each month a contractor is likely to have a few invoices which he wants to pay, some he may have already paid and some that he does not want to pay. The program reveals a list of these invoices along with the details. The user fills in the status – paid and OK depending on what he wants to do and then switches to automatic cash posting where the set of invoices which are going to be paid, are printed. The speed with which David Keeling moved from program to program, filling spaces with relevant information etc, made it all seem amazingly easy and this is the more difficult program of the two!

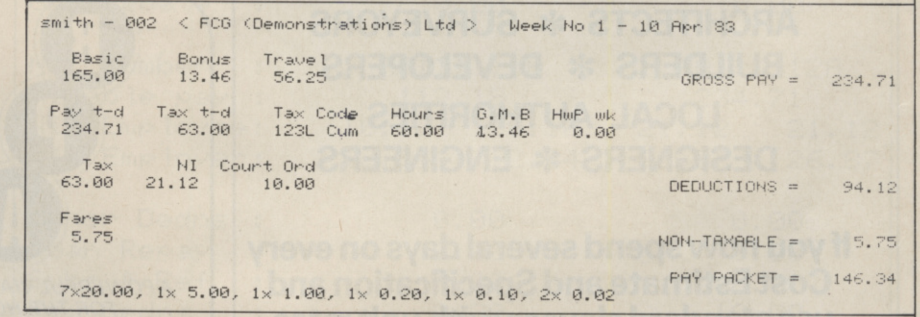
The majority of the people using this system have an average turnover of three million pounds and David Keeling estimated that the turnover of their customers varied from a quarter to twenty million pounds. The floppy disks which are most commonly used can handle up to 3,000 ledger accounts and 3,000 transactions each month. This can be increased up to 25,000 ledger accounts by using the hard disk. There is also an option of using up to eight terminals in different locations with the hard disk. Of the companies using this system, only about half a dozen use the hard disk, most of FCG's customers are satisfied with the floppy disks with their potential of handling a firm with an 8 million turnover. Because there are so many considerations involved when calculating the pay cheque of an employee in the building industry the payroll program is invaluable.



```
5.4          Contractors Payroll System
FCG Computer Systems================MENU=======================01-388 7345
                                         :
       Payroll Cycle Programs            :        Control Programs
     1 Payroll Status                    :     21 Amend Employee Data
     2 Sick Pay Calculations             :     22 Amend Contract Data
     3 Timesheet Entry                   :     23 Amend Employee Giro Data
     4 (Separate Bonus Entry)            :     24 Employee leaving
     5 PAYE Calculations                 :     25 P7X Tax Code Changes
     6 Print Payslips                    :     26 Alter System Parameters
     7 Print Bank Giro Credits           :
     8 Print Cheques                     :
     9 Contract Cost Analysis            :
    10 Payroll/Accounting Link           :
                                         :
                                         :
                                         :
       Print Programs                    :        Other Programs
    11 Print Employee Data               :     31 Generate New System
    12 Print Contract List               :     32 Copy Disk
    13 Print P14/60/35 Returns           :
                                         :

       Enter Program No ? __
       '**' =Return to Commodore Basic : '??' = Enter Program Name
```

Another example of contractors Payroll System showing Menu of payroll.



```
smith - 002  < FCG (Demonstrations) Ltd >  Week No 1 - 10 Apr 83

  Basic      Bonus    Travel
 165.00      13.46     56.25                          GROSS PAY =   234.71

 Pay t-d    Tax t-d    Tax Code   Hours   G.M.B  HwP wk
 234.71      63.00     123L Cum   60.00   13.46    0.00

   Tax        NI   Court Ord
 63.00     21.12      10.00                          DEDUCTIONS =    94.12

 Fares
  5.75                                             NON-TAXABLE =     5.75

                                                   PAY PACKET =   146.34
 7x20.00, 1x 5.00, 1x 1.00, 1x 0.20, 1x 0.10, 2x 0.02
```

Payslip detail report.

The payroll is easier to operate than the Accounts program because each month the same information is repeated. With the former program, a greater variety of varying information is needed. The Payroll program can cater for six different trades; for instance plumbers, engineers, brick-layers etc. There are a lot of different points to consider when working out the payroll and the program methodically takes the user through each consideration. With the overtime calculations there are four different categories available. For instance different rates may exist within a company for overtime after weekday hours, on Saturdays and on Sundays. Holiday stamps are another unique feature in the building trade and again there is more than one category of stamp. The Travel Allowance also has several different headings, for instance Travel, Junior Travel, both of which are taxable and Fares Travel which is non taxable. The grid reference of the employees place of residence and his work can be marked out and the distance between these two points calculated, there is even capacity for a dog leg journey. Optional space for pay types which do not come under the normal headings is also available. For instance alimony payments, or even as David Keeling recalled a weekly contribution to the company football pools! All these payments would have had to be laboriously worked out by a team of mathematicians with a fair amount of mistakes and approximations. Now the error quotient is avoided and employees will be sure of fair and exact wages. The pay slip report for the firms' files contains all the information with relevant parts filled in (see diagram of payslip) and the actual employee payroll slip has no unfilled categories, as these are automatically left out. In this package the two modules are linked and the information

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on wages will be automatically filed onto the Accounts system in all the relevant places.

The function for amending data on employees illustrates that there is also a capacity to 'think' in this program. If the date of birth is below or above a certain date, the program informs the user that the person is too young or too old! Again all data on the employees is passed onto the Accounts. If a man has not been processed or is absent, the user is informed of the error, which is helpful if there are a few thousand employees to deal with. Perhaps the selling point of this program is that it has a Contract Cost Analysis telling the company how much they have lost in labour over the contract.

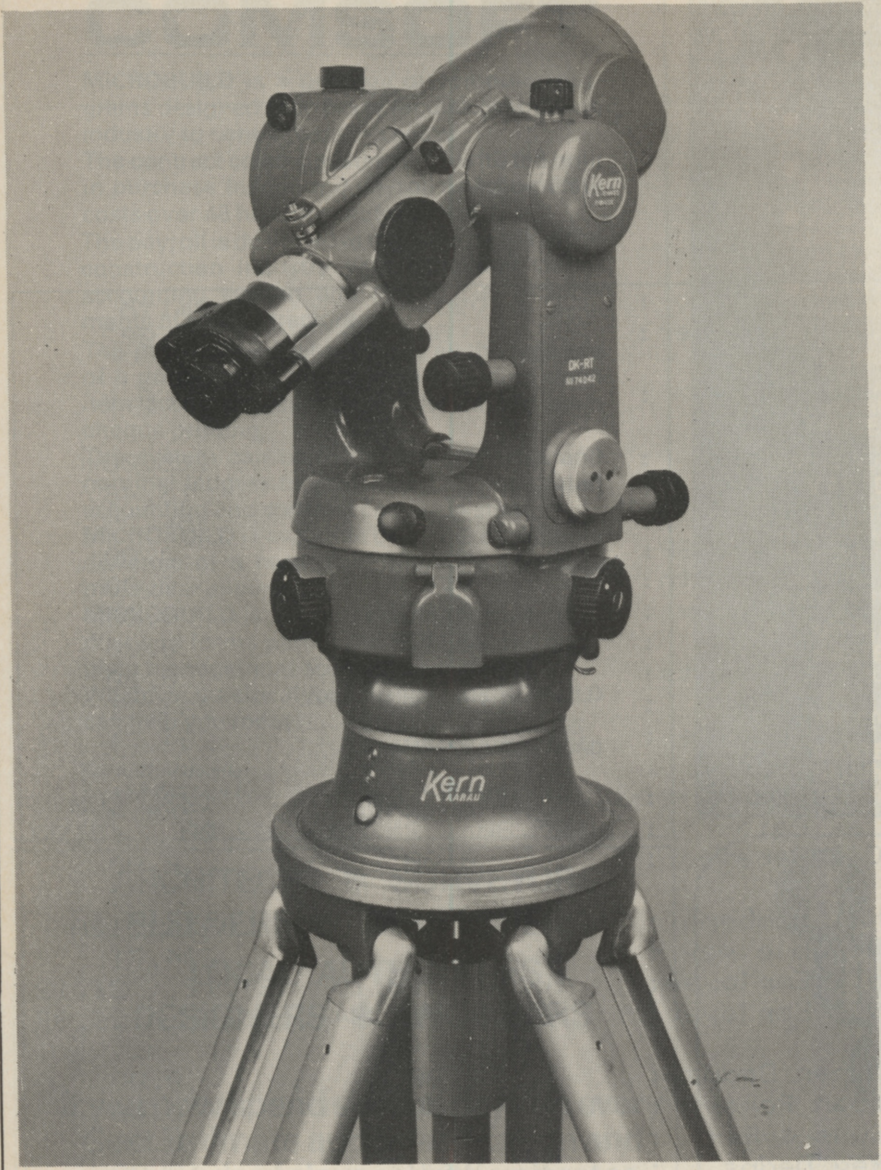
If asked to sum up this Integrated Accounting package by FCG in two words, I would definitely say 'very comprehensive'. Besides the normal considerations in any Accounting and Payroll package, there are allowances for extra functions and this means that with the Alter Parameter function this applications package can be tailored to suit any Construction company with no trouble at all. The company are constantly testing versions and making changes in the routine. For instance at the present, FCG are altering the Cash Posting function in the Accounts Program to make it more sophisticated. They are also improving the profit and loss program. They continue to keep in contact with their customers and send them all the newly improved software. They also maintain good customer relations by answering any queries and try to help with problems, users may be having. The program is available for use on the Commodore range, with Commodore disk drives and printers.

Cost: *Accounts Program: £1,100. Payroll Program: £1,100.*
Area: *Accounting and Payroll*
Company: *FCG Computer Systems*
Address: *Hamilton House,*
Mabledon Place,
London WC1H 9BD
Tel: *01-388 7345.*

```
Name          :      bloggs           smith
Works number:          001              002

Hours         :        45.0             60.0

Basic Pay     :       95.00           165.00
Bonus         :       13.46            13.46
Travel        :        3.72            56.25
Sick Pay SSP:          0.00             0.00
Sick Pay Oth:          0.00             0.00
Holiday Pay   :        0.00             0.00
Other         :        0.00             0.00
Reg Payments:          0.00             0.00
Gross Pay     :      112.18           234.71
G P to date   :      112.18           234.71

Tax Code      :      132L Cum         123L Cum
Tax Paid      :   25.80   25.80   63.00   63.00
O/S Rebate    :        0.00             0.00

NHI Number    :     AA111111A        AA111112A
NI'able pay   :      112.18           234.71
NIC Employee:     10.10   10.10   21.12   21.12
NIC Employer:     12.84   12.84   26.87   26.87

Other Dedns   :        0.00             0.00
Loan Repay    :        2.00             0.00
Subs & Ref    :        0.00             0.00
Reg Dedns     :        0.20            10.00
Total Dedns   :       38.10            94.12

HWP Stamp     :   9.65A 109.65    0.00E   0.00
Holiday Pay   :   -                        -
Fares Allow   :        3.45             5.75
Other Addns   :        0.00             0.00
Reg Addns     :        0.00             0.00
Total Addns   :        3.45             5.75

Amount Paid   :       77.53           146.34
Payment Type:          Cash             Cash

Reg Payments:     0.20Football    10.00Court Ord
              :
              :
```

Example of employees Payslip shown above.

MICROS IN CONSTRUCTION



Microsurvey

The MICROSURVEY System is composed of a range of separate programs and is designed for use in surveying. It handles office reduction and calculation work in site surveying and in setting out. Each program is intended to cope with the computation aspects of a particular task. These programs can be combined to form a system suitable for the individuals users' needs, for example in traverse surveying, levelling and on a EDM tache survey. Each system includes a master control program which handles file copying, and will load and run the various programs in the system as they are needed. Data entered for a particular job, may be stored in a disk file and a modifying function is featured so that if errors are discovered or if design parameters change, these can be corrected or altered. Printed records of a task completed or of stored data are easily obtainable.

A significant variety of programs are available and they could probably be combined to complete any task a surveyor might pose: reducing and adjusting levels; corrects taped distances for slope and temperature; computes and adjusts traverse co-ordinates; deduces polars for setting out points on site, if given their rectangular co-ordinates; establishes rectangular co-ordinates and tangential angles for points on horizontal circular curves; designs vertical curves and determines the setting out data; calculates 2- or 3- dimensional co-ordinates for detail points in EDM tache survey; transforms rectangular co-ordinates from one grid to another; concatenates, sorts and lists point co-ordinates; solves triangles, co-ordinate intersections and calaculates areas, volumes and conversions. Under development are transition curves and resection.

MICROSURVEY is recommended for Site engineers, builders, architects, and surveyors and can be run on the CBM 64, 4032, 8032 or 700 with a disk drive or printer.

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Tel:	*0537 58 283 or 0455 637871*

Masterbill

Masterbill is for Quantity Surveyors working in private practises and local government. The Bills of Quantities system is available with a comprehensive library of descriptions based on the Fletcher/Moore's standard Phraseology, which is the industry's standard. One of the features of this system is ease with which the libary can be amended, extended and re-printed by the users. The system deals with the entire process from coded dimensions to printing bills of quantities in various formats. During the construction period, prices can be added and cost analyses produced for use. Final accounts are also produced.

Another Bills of Quantities has been designed and this can do everything that the first one can do; complete sortation by the computer, print-out by 'elements', 'types' or 'blocks' and full cost analysis. In addition the user can set the whole of his own library.

This library can be as simple or as complicated as the user chooses and is of particular use in the following applications. With a professional Quantity Surveyor to be used for cost planning and setting up a special library for refurbishment projects or for setting up a non-Fletcher/Moore library ie an external works disk. It can be used for quantity Surveyors working alongside contractors to produce tender bills with short descriptions and for sub-contractors who produce their own specialist bills. Masterbill 2 can be used to measure M. & E. Services and for also for measuring under the Civil Engineering S.M.M. and under the International Principles of Measurement. It can also produce Final Accounts.

MICROS IN CONSTRUCTION

The user can have as many or as few library disks as desired, the codes can start with only 3 or 4 digits for each item and can choose his own code. Modules can be bought separately and as no library or licencing is involved, the cost of this program is quite competitive. Masterbill runs on the Commodore 8000 series, and using the 8096/8250/6400 combination, a comprehensive Bills of Quantities system is now available.

Cost:	*Masterbill: £950 to £1400 + VAT (depending on modules required)* *Whole system plus hardware: £4000.*
Area:	*Quantity Surveying*
Company:	*Masterbill Micro Computer Systems*
Address:	*St John's House, 23 St John's Road, Watford WD1 1PY*
Tel:	*0923 38551*

Hornet

To carry out any project successfully, whether building a bridge, launching a satellite or constructing a housing estate, effective management is crucial. The organisations resources must be employed effectively and smoothly coordinated and Hornet has been developed to help do exactly that. The package uses well established management techniques to provide a program which is effectively a tool and with it, a user can plan activity date schedules, the budget and efficient resource utilisation.

The plan made at the beginning of a project paves the way for its successful completion. Communication is important, especially if a large number of people are involved; Hornet provides an invaluable service with its sort and select system which presents relevant information clearly, to the interested Department or person.

Any changes which need to be made; delays, varying costs, budgets, changes in supply are easy to affect and will be automatically reflected throughout the project. One of its main attributes is the ease with which it can be used. The VDU screen is the important link between the user and the machine and the authors have put in a lot of effort to make visual displays both familiar and interesting, with particular emphasis on colour and visual graphics. The clarity and quality of the reports is maintained whether for a standard report or one using the generator. This allows all the project information to be included in bar charts, resource histograms, date schedules and s-curves which the user will need.

The Hornet can be interfaced to the Commodore 8000 series and is a powerful application for this range. As an added bonus, Hornet can also be interfaced with Silicon office substantially increasing the management facilities. The program disk is simply replaced by the Silicon data disk and information is transferred freely in either direction between them. The manual is clear and intelligent and Hornet provide a full support to all their customers.

Area:	*Project Management*
Cost:	
Company:	*Claremont Controls Ltd*
Address:	*Albert House, Rothbury Northumberland NE65 7SR*
Tel:	*0669 21081*

Building Services Program

Tecpac have produced a comprehensive series of programs for engineers and designers working in the Building industry. The programs are all designed to incorporate the standard procedures of CIBS (Chartered Institution of Building Services) and were originally intended for a mechanical service contractor. The program offers a cost-effective, practical aid to engineers and designers enabling them to concentrate on the design and choice of parameters, while the calculations are carried out by the computer.

The Building Services programs are available individually or in four related packages. These packs enable a company to respond quickly to a request for a quote and help to complete a job efficiently due to time and effort saved over routine calculations. In Pack one, the Heat Gains Calculations module, four programs are available. It basically works out the heat gain in a building using various procedures. For example it determines the 'U' value and the decrement factor for any specified multi-layer wall or roof, works out the heat gains and cooling loads in a series of rooms/modules in a building and also includes effect of shading and recessed windows. The second Pack is Heat Loss Calculations and it is made up of a suite of four programs. These predict the possible occurence of interstitial condensation in multi-layer walls and roofs, calculate heat loss for a series of rooms and can calculate heat loss from radiators. Four programs are available in the third pack – Pipe and Duct Networks. This can carry out a ventilation duct analysis, it checks pipe and radiator connections, measures pressure drop, fluid flow velocity and can create a duct library. The fourth Pack contains three programs for Electical lighting. This calculates lighting and glare in a room, measures the distribution of direct and reflected lighting and creates a library of flourescent luminaries for a print out. These are only summaries of what the programs can do as the actual programs are very comprehensive.

The software packages can be run on a variety of hardware: The Commodore 500, 700, 4,000 and 8,000; Apple 11, Apple 11E, Apple 111 with any serial or parallel printer; Tandy 11 and a wide range of CP/M 80 machines. New hardware options are always being developed enlarging the scope if this package. Other related programs available on order are Daylighting, Heating Price Sizing, CWS/HWS and noise calculations.

Area:	*Engineering and designing*
Cost:	*Pack 1: £900+ VAT,* *Pack 2: £300+ VAT* *Pack 3: £600+ VAT,* *Pack 4: £450+ VAT* *Set of four packs: £1,800*
Company:	*The Technical Software System*
Address:	*BHRA Fluid Engineering Cranfield, Bedford MK43 0AJ*
Tel:	*0234 750102*

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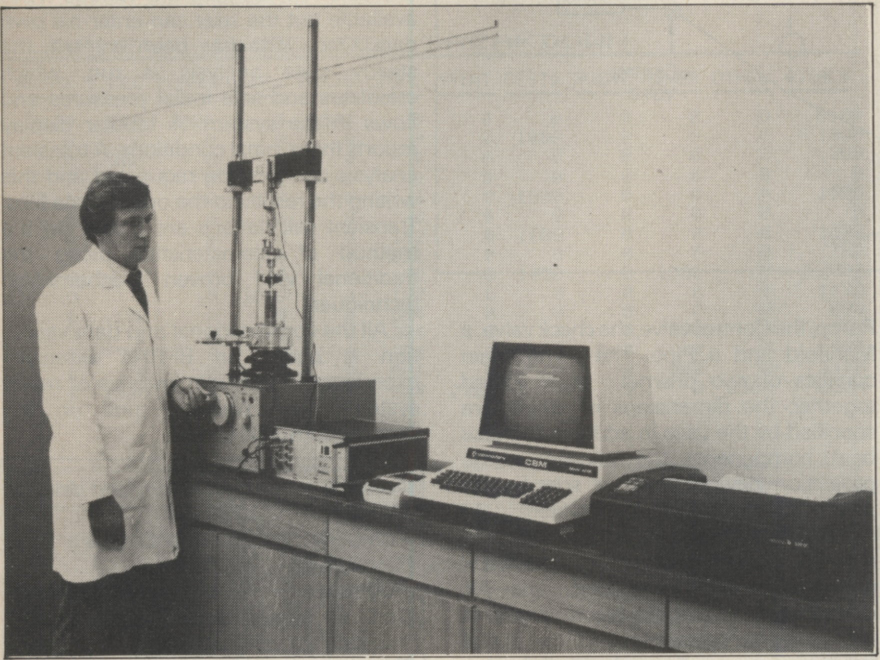


Data System 4 being used to control and monitor a triaxial soil test.

Data System 4

ELE data System 4 is a unique development in the field of civil engineering materials testing. Before constructing any building, the physical conditions of the site have to be analysed and the results used by the civil engineers in their building plans. This system provides the engineer with computer-controlled recording and analysis of soil testing data, directly coupled to machine operation. Soil can differ in permeability, compaction, ph, moisture, density, organic matter content, particle size distribution etc and the system is able to process soil samples and analyse the exact components.

Among the advantages of the package are the cost-effective benefits in productivity, less time spent in operating apparatus, results are automatically logged saving more time, less risk of errors in the calculation of results and printing and plotting is produced ready without need for further work. The package has been designed by qualified experienced engineers to ensure that all the procedures are along the lines of the existing well-established experimental procedures. A step by step dialogue takes place with the operator who responds to questions displayed on the screen and is led through each stage of test from the initial adjustment of equipment to the final test result.

Each system is complete with a fault-finding software package able to detect any errors in the hardware or in the experiment routine. The actual program covers Transducer calibration, the fixed and floating point; quick undrained triaxial test; consolidation logging and analysis; direct/residual shear; effective stress triaxial compression tests and data acquisition. The system is designed for use with the Commodore range of desktop computers, plus a cassette player and a printer/plotter. ELE recommend that the system is installed by them and users may train either at the ELE laboratory or by one of their engineers travelling overseas. The whole system can be bought complete with the basic computer system, interfacer unit, and all the available programs, the consolidated and triaxial soil testing for example. Individual programs can also be purchased separately.

Cost:	*Complete set: £16,000+vat.*
Area:	*Soil testing in laboratory conditions*
Company:	*ELE International Ltd*
Address:	*Eastman Way, Hemel Hempstead, Hertfordshire HP2 7HB.*
Tel:	*0442 50221*

CIRCE

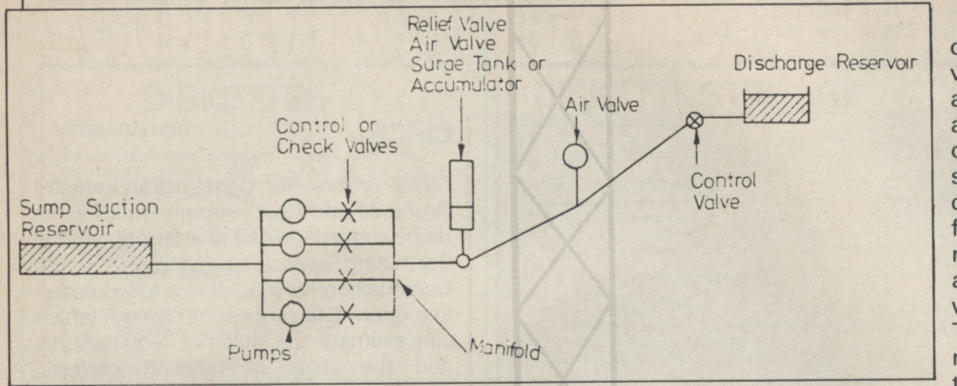
CIRCE is short for Construction Industry Resource and Cost Estimating and as its name suggests is one of a selection of the Estimating application packages in the Construction Industry. It is a fully interactive open data processing system which can estimate the material requirements and the costs of building projects, especially useful when planning and keeping to a strict budget. One of the major features of this package is that it is able to store data on and between data entities, and numerical factors can be entered where appropriate.

It is an adaptable program and the data system can be altered to suit the particular needs of most organisations. If prices are unknown, the majority of technical data can be entered and the costs added when they are available. If during the construction, there are variances between prices of resources allowed for in estimates and those actually used, the program can calculate them and identify any problem activities. Data concerned with the relations between the dimensions of a building and measured item quantities, can be stored together with those on resources. The significance of this is that the 'resource and cost models' of building projects can be constructed by design teams and estimators using drawings and specifications, instead of using the separate process of measurement. These models can also be retained for future use.

It is possible that any assembly process, for example engineering, jobbing, catering could use the CIRCE data system, which runs on any Commodore Computer from the 64 to the 700 series. Resource files on disk with programs can be supplied to customers, supported and updated as required.

Area:	*Estimation in Construction*
Cost:	*£1250 to £2500, depending on features and the (provision of resource data files. Consultancy at agreed rates.*
Company:	*Construction Measurement Systems Ltd*
Address:	*Hafod, Peatling Magna, Leicester LE8 3UQ*
Tel:	*053758 283 or 0455 637871*

MICROS IN CONSTRUCTION



Transient Analysis

This program is designed for engineers and designers who have some knowledge of pressure surge (water-hammer). It is used to predict pressure/time and flow/time histories in a single pipe system, following pump failure with perhaps a valve operation. Some surge protection devices are available to investigate their effects on system behaviour.

The program models a single pipe rising main type of system. The fluid is assumed to be Newtonian and flow is presumed to be single phase. See the diagram for a typical system. There are six basic components; the Reservoir, the Pump, the Control valve, the check valve, a Manifold and a Pipe. The rising main consists of two prismatic pipes joined together, the dimensions of which are specified by the user. In addition to these basic components, the following surge protection devices may be specified at given locations in the system; an Accumulator which is an air bag type device, Surge tank where overflow/drainage can be simulated. The Air inflow/output valves which can operate at user defined pressures and the Relief Valve, a pressure dependant relief valve venting to atmosphere.

To enter data the user can use the disk or keyboard. With the pumps, control valves and check valves, standard data is available representing the various types available but the user can enter his own data. Once data has been entered, the steady state analysis is run, which calculates and sets initial pressures and flows in the system. A tabular display reports these initial conditions. A transient analysis can then be requested and this writing the results to the output data files. Transient calculations are based on the method of characteristics using the traditional well proven mathematical techniques.

All the computational and data validation is based on BHRA's extensive experience in transient analysis of many systems. The package runs on the Commodore 8000 series.

Area:	*Engineering and design*
Cost:	*£750+ VAT*
Company:	*Technical Software System*
Address:	*BHRA Fluid Engineering Cranfield, Bedford MK43 0AJ*
Tel:	*0234 750102*

MICROSPEC

Intended for architects and surveyors who need a package for cost estimation and an unpriced schedule. The latter is sent out to building contractors when tendering for work. These two programs are based on a standard library of tasks which is updated and maintained through each option, in the main program and during the financial rate of each task. It has been designed, so that each part of the program is fully interactive with the rest of the program. For instance every task in the main library is referred back to a materials and workmanship list which contains all the necessary details. This along with a printed copy of the preliminaries and contract conditions enables the user to convert the earlier schedule of works into a full jobs specification.

Everything that has to be despatched either when tendering or submitting the full contract is produced from just two places. The facts and figures come from the program itself and the standard printed works; the contract, form of tender for example are all available with the package or for a small fee, on a disk. The manual is comprehensive and a dongle provides the security. The program is easy to use and starts with menu listing the seven options; library maintenance, library print, factor maintenance, job clause preperation, print out cost estimate, summary of the cost estimate and a print out of the work schedule. It runs on the Commodore 8000 series, the 8050 disk drive and uses either a dot matrix or daisy wheel printer depending on the letter quality desired.

Area:	*Cost Estimation*
Cost:	*£845+ VAT*
Company:	*Valtec Ltd*
Address:	*345 Gray's Inn Road London WC1X 8PX*
Tel:	*01-833 0105*

NEDO

This comprehensive program is designed to enable all increased cost calculations to be carried out in accordance with the NEDO formula rules. The NEDO category indices issued each month are stored on file and accessed by a date code. Gross values in each category are entered, from which the increases are calculated. The package is primarily for surveyors or any operators able to extract required information from the surveyors valuation and can be interactive or used by a single user.

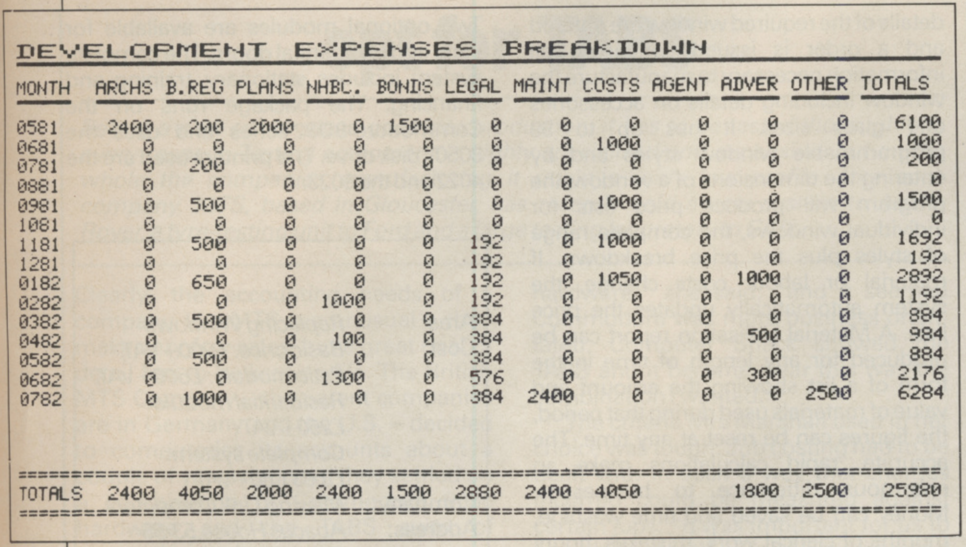
Each month the latest category indices are entered and the provisional-to-firm updated as the information becomes available. When a new contract is commenced the necessary information regarding base date, project name, etc together with the anticipated number of valuations. From this, a file is created which will store information for each valuation. Calculations are performed by first entering the valuation number and date, then the gross figures for each category. Corrections and alterations can always be carried out. Valuations are recalculated when indices become firm.

As each valuation is calculated the gross figures in each category are printed out. General, fix only and specialist categories are dealt with in turn. A summary of gross-to-date, total for month and the increase/decrease is printed out for each category. Any updates or amendments are also printed out for reference.

The program is written in compiled Basic and designed to be very easy to use. It can be used on the Commodore 8000 series with a 8050 or 8250 floppy disk and a suitable printer. Also available on the Commodore 700 range.

Area:	*Cost Calculations with NEDO rules*
Cost:	*£315+ VAT*
Company:	*C-QS Computer Services*
Address:	*27 Ball Street, Reigate Surrey RH2 7AD*
Tel:	*07372 22249*

MICROS IN CONSTRUCTION



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DEVELOPMENT  EXPENSES  BREAKDOWN

MONTH   ARCHS B.REG PLANS NHBC. BONDS LEGAL MAINT COSTS AGENT ADVER OTHER TOTALS

0581     2400   200  2000     0  1500     0     0     0     0     0     0   6100
0681        0     0     0     0     0     0     0  1000     0     0     0   1000
0781        0   200     0     0     0     0     0     0     0     0     0    200
0881        0     0     0     0     0     0     0     0     0     0     0      0
0981        0   500     0     0     0     0     0  1000     0     0     0   1500
1081        0     0     0     0     0     0     0     0     0     0     0      0
1181        0   500     0     0     0   192     0  1000     0     0     0   1692
1281        0     0     0     0     0   192     0     0     0     0     0    192
0182        0   650     0     0     0   192     0  1050     0  1000     0   2892
0282        0     0     0  1000     0   192     0     0     0     0     0   1192
0382        0   500     0     0     0   384     0     0     0     0     0    884
0482        0     0     0   100     0   384     0     0     0   500     0    984
0582        0   500     0     0     0   384     0     0     0     0     0    884
0682        0     0     0  1300     0   576     0     0     0   300     0   2176
0782        0  1000     0     0     0   384  2400     0     0     0  2500   6284


==============================================================================
TOTALS   2400  4050  2000  2400  1500  2880  2400  4050        1800  2500  25980
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Building Project Analysis

This package was prepared in close liaison with members of the housing construction industry and is designed for use in that area. It is a viability and cashflow study enabling the user to produce information and cashflow reports quickly for any particular building project. It is composed of four programs; the B.P.A. 1, the B.P.A. 2, the Plan and the Prime Cost Analysis program and all of them enable data files to be stored and updated.

The B.P.A. 1 deals with monthly costing and cashflow projection. To compile data on cashflow analysis, the user needs to use parameters such as land costs, legal and stamp duty fees, interest rates, construction costs etc together with the rates of expenditure and a sales program. Any of the information being put into the program can be changed to make sure the work is possible or it can be updated to monitor any work in progress. Other possible printouts include the interest costs, accumulated interest, investment and profit, accommodation schedule and percentage profit of sales revenue.

The B.P.A. 2 is similar to B.P.A. 1 and is concerned with producing a fixed price tender in which the construction costs contain the element of profit. Having produced a viability study with the B.P.A. 1 program, a tender can be prepared where the profit has been included in the construction costs. The tender is printed in an account sheet format and portrays a breakdown of costs for example legal fees, sales costs advertising (see diagram) together with an accommodation schedule.

The Plan program consolidates projects on a monthly basis giving accumulative totals, thus providing an overview of the cash requirement and work in progress. The Prime Cost Analysis program takes costs for each unit type and then a number of these units are amalgamated with the main development site cost budget. This provides the overall cost of a building project. The elements are broken down into several separate reports. The whole program has been designed with the experience of the housing construction industry and with the user in mind. All the screen displays will be familiar and easily interpreted. Further proof of its viability is that it has been successfully used by a number of housing construction firms. Microhex sell each of these as separate programs, but if a firm want the whole set, they sell the set at a reduced price and tailor the program to the company's needs by taking the irrelevant parts out.

Cost: *Per Modules: £350+vat.*
The Set with relevant adjustments: £750+vat.
Area: *Project Analysis*
Company: *Microhex Computers*
Address: *Union Street,*
Trowbridge, Wiltshire
BA14 8RY
Tel: *02214 63828*

Microbuild

Comsoft have introduced a low cost, all-inclusive package for the construction industry. Aimed at small to medium sized companies with little or no computer experience, the authors have kept the user in mind and made it easy to understand and use. Microbuild can also be used in large organisations which need local computing power capable of linking to mainframe or mini computer installations. It is designed to provide contractors with up to date information on all the various costs associated with every contract they are handling.

The three constituent parts of Microbuild cover the Payroll, Purchases and Contract Costing and each module links automatically to the others providing a well integrated accounting and contract cost system. For example, all the information keyed into the payroll program for the statutory payroll reports, is also used to update the Contract labour costs via the Contract Costing program. The system has been produced for the building industry and includes special requirements for subcontractors – the holiday stamp accounting system for example. Each of these modules can be purchased seperately so that if a customer only needs the Payroll program he needn't buy the whole set, a very flexible approach.

The Contract Costing program is concerned with cost details on contracts and for each one, budgets for up to 48 expense headings are available. Features include a history of all completed contracts, a detailed transaction and monthly or quarterly reports. The Contractors payroll program can handle the complicated pay structure system currently existing in the building industry with programs capable of dealing with statutory sick pay, holiday pay and the stamp schemes. The Purchase Ledger program is used to keep the supplier accounts informed on all activities and payments. It has an invoice display, remittance advices and a query function in case of suspect invoices.

Area: *Foundation Cost Control*
Cost: *Each module: £350+ VAT*
and set of three
programs:
£1,050+ VAT
Company: *Comsoft Associates*
Address: *2c-2d Wake Green Road,*
Moseley, Birmingham
B13 9EZ
Tel: *021-449 9151*

MICROS IN CONSTRUCTION

Replacement Window System

In any construction project, ensuring that the right sort of windows are installed at the right price is essential and any mistakes can be disastrous – even fatal. Missing Link have developed a software package to take the chance out of replacing windows and their dynamic program is one of flexiblity and power. It is very simple to use. The first display shows all the available programs (see diagram). Each one, when selected by pushing the relevant number, takes the user through the available options such as designing new window styles and the user can tailor the program to suit individual business needs. The program comes with a set of standard deductions and these along with any of the information in the system can again be altered to suit a users requirements.

Six types of printed report convey a comprehensive variety of information, for instance works Orders, Cost and Glass summaries, Price and Styles lists and Material Utilisation. With the Works order printed report, the customer's name and details of the required window are entered and a order is issued containing all information necessary to manufacture the window including details on accessories and glass sizes. It has up to 99 programmable window styles and by entering the dimensions of a window, the program will produce price lists for individual windows, the complete range of styles plus the price breakdown. If material or labour costs change, the system automatically updates the price lists. A Material Utilisation report can be produced for any length of time in the form of a list showing the amount and value of materials used during that period, the figures can be reset at any time. The accurate, rapid calculations make an enormous difference to businesses. Money can be saved and time wastage, months of clerical work, mistakes, hours spent evaluating information can all be eradicated with this package.

Additionally with the appropriate software the system can handle accounting, wordprocessing, payroll and mailing lists. Two optional modules are available for Patio and Residential doors. The complete system includes stationary, training and financing. The package runs on the Commodore 8032 series and uses the 8050 disk drive. The printers used are the 4022 and the 8023.

Area:	*Replacing Windows*
Cost:	*Basic price: £900+ VAT,* *Patio module: £500+ VAT,* *Residential module: £250+ VAT* *Complete system: £3,631.50+ VAT*
Company:	*Missing Link Computers*
Address:	*Abacus House, 53-55* *Ballards Lane, London N3*
Tel:	*01-349 4711*

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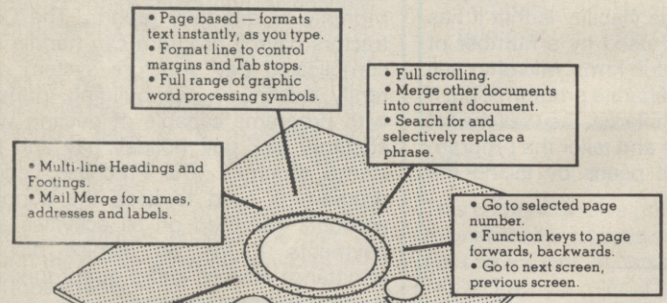
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TEL: MEDWAY (0634) 813780.

VIZA SOFTWARE

Leading test systems Company opt for TABS

Before a new car or plane goes into production, it has to be tested thoroughly in every respect. Testing equipment is highly specialised and expensive, but on the whole the companies manufacturing it retain a fairly low profile. One such company, MTS, based in Gloucester, has recently sold a new system to Austin Rover, a tyre-testing unit to Ford and a large testing laboratory to GKN.

Clearly, the accounting needs of a company like MTS are unusual – they make very few sales, but a great deal of detail has to be kept on file. The British MTS Company – the parent companies are in Germany and the U.S. – decided to computerise its accounts about a couple of years ago, and they settled on a combination of Commodore 8096 hardware and the TABS suite of accounting packages.

The British MTS company has grown considerably since it was established in November, 1979. Then it employed four people – now there are eight; and the turnover has increased from £250,000 to £3 million. MTS buys the testing equipment from its parent companies, and re-sells them to the U.K. customers. These sales are followed up with a comprehensive servicing and support operation – which sometimes extends to overseas customers when the expertise is required.

There is a certain amount of automation within the orders, so the accounting needs, particularly for project costing, are complex and demanding.

Linda Marshall, MTS Company Secretary, recalled the transitional period between the old system and the TABS/Commodore combination. "Two years ago, we were using accountants in Bath for the job, but this was proving expensive and inefficient," she said. "We were having to prepare figures for submission to both West Germany and the States, so we decided to bring the whole thing in-house with a computer system."

Mrs Marshall spent nearly 18 months looking for the best system; she visited trade exhibitions, looked at computer magazines and saw other companies' systems. "What I needed was a fully integrated and standardised system." She said.

It was Computer Shack, a well-known Cheltenham computer dealer who introduced Mrs Marshall to TABS. "I had looked at Apple and Commodore hardware," she said, "and it seemed Commodore was more business orientated. Computer Shack showed me TABS and it became clear this was the combination I wanted."

The criteria Mrs Marshall used in her choice was tough. Job costing had to be dealt with in such a way that charges incurred could be measured against certain jobs. "It was important for us to be able to identify, easily, overspending trends," she said. "This would obviously help to ensure costs were controlled properly, and aid invoicing."

Another important criterion for Mrs Marshall was ease of operation. "No-one here had used a computer system before – myself included – so I was looking for both reliability and a readily comprehensible instruction manual."

There was a time when Mrs Marshall had thought that she would only get the kind of sophistication she was looking for on a mini-computer, but as she puts it, "TABS seemed to give me all I could get on a mini for a lot less cost."

The elements of the TABS suite that Mrs Marshall has are Purchase Ledger, Sales Ledger, Nominal Ledger, Stock Control, Job Costing and Payroll. These TABS modules are integrated so that where relevant information supplied to one ledger will automatically be accounted for in others.

"The system has already saved us a great deal of time and money," said Mrs Marshall. "The month-end figures used to take two weeks, now it is down to about three days. And just in accountants' fees we are saving between £500 and £600 every month."

At first, though, not everything seemed as simple as it does now. "We had never used computers before and we had never done our own Management Accounts. So for about three months we retained the accountants' services in parallel with the computer system."

"We also had a TABS consultant in for two or three weeks after installation who helped us set up the integration and generation.

Meanwhile, the accountants helped assure us that everything was OK on the accounting side."

Now, different members of staff at MTS are trained in different aspects of the computer system – one handles payroll while another general accounting. Payroll, incidentally, may seem a little excessive for a company employing only eight people, but as Mrs Marshall explains, it is a lot easier to have it integrated with everything else. Also, with Statutory Sick Pay being introduced last April, the stored information and calculations on payroll are probably better handled by computer.

MTS now have two Commodore 8090 machines with 5¼" disk drives, one of which is used largely for word processing, the TABS software and two printers, an Epson for day-to-day work and an Olivetti daisywheel for letters and invoices.

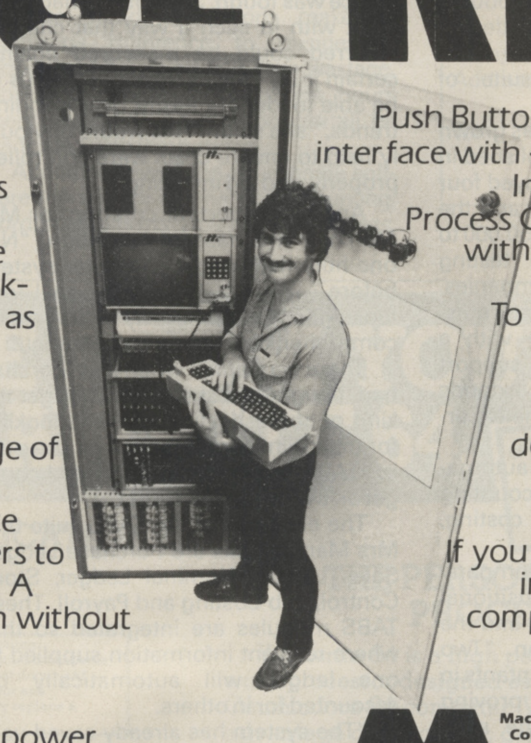
The small disk is quite adequate for Mrs Marshall's purposes because the volumes of data dealt with are relatively small.

From a company point of view, the U.K. acquisition of TABS and Commodore has been received very well indeed. "The U.S. Vice President of MTS came over recently, and was very impressed," she said. "He saw it as one of the best accounting systems within MTS worldwide. It really has been a milestone in MTS history."

In fact, Mrs Marshall is soon to visit MTS, France, where she will be looking at their accounting system. Should there be a need for a computerised system then the TABS/Commodore combination will be at the top of her list of recommendations. "I am delighted with the independence and control TABS has given us," said Mrs Marshall. "We have achieved exactly what we want; I have saved myself a lot of time, freeing me for more positive management and personnel work. And the extent of extra information has made budgeting a good deal easier."

MTS is a company which makes few sales – and purchases – of very high cost, and as such has to keep accurate control of accounting. The TABS suite offers the integration, accuracy, speed and ease-of-use required at a very low cost on Commodore equipment. The financial information for their own use can be obtained as well as the appropriate reports for the parent companies.

THE COMPLETE TOOL-KIT



Machsize at work

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PLOTTERS

Most businesses could find uses for a plotter, but they are the sort of item of equipment which is great fun to use. This means that some people will got out of their way to find reasons why a plotter is absolutely essential. Here we put plotters in perspective.

Watching a plotter at work it's easy to see why many people approach them with some trepidation. And looking at the prices of plotters will increase that trepidation.

As the pens mover over the paper at speeds up to 15 or 16 inches per second producing highly detailed multicoloured graphics as if by magic it's easy to forget that a plotter is really only another kind of printer. The computer simply tells the plotter where to move the pen instead of telling a printer which character to print.

Plotters have a variety of uses and which plotter you buy will depend on your requirements. A businessman who only wants to represent information graphically to make it easier to understand for annual reports or sales presentations will probably be satisfied with a simple desk-top A4 plotter with fairly limited capabilities.

Architects, however, may want much bigger, very accurate drawings in which case a more sophisticated – and consequently usually more expensive – plotter will be required.

There are a number of variables to bear in mind when considering plotters but it should be remembered that nearly all plotters are basically the same! You should not, for instance, be too impressed by a salesman who tells you that his plotter could plot a thousand points on a line an inch long.

It sounds too obvious to mention but interfacing is important. A businessman ought to bear in mind future requirements when buying any peripherals. A change of computer could make thousands of pounds worth of peripherals redundant. The adaptability of a plotter is something worth considering.

Look, too, for local intelligence. There are a few plotters with no intelligence but the majority have some built in intelligence. This makes them much easier to use – another point to remember when buying a plotter.

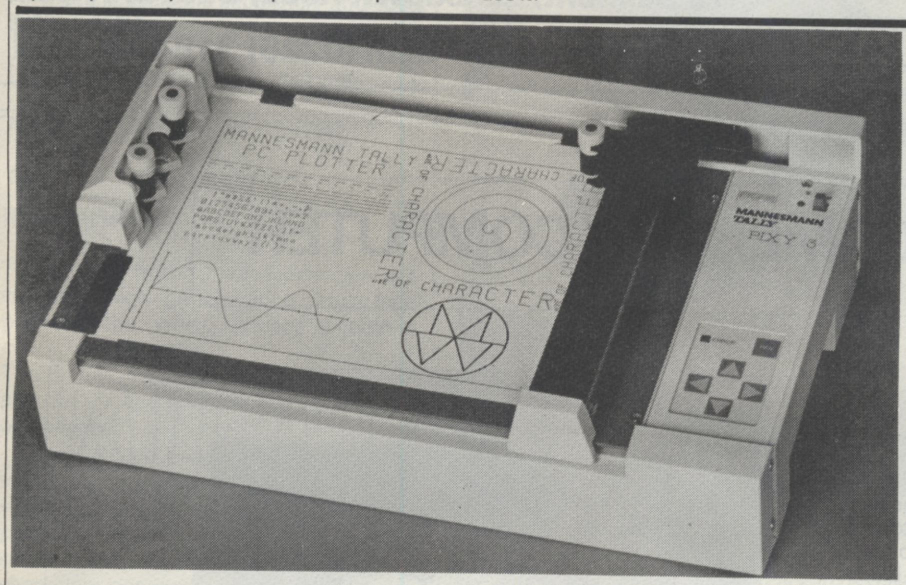
If you are buying a plotter for someone else to use make sure they will be able to use it!

Some plotters are supplied with a buffer memory which means that the plotter can be plotting graphics while the computer is being used for something else. This sort of facility is obviously only important if you have a lot of plotting to be done.

Don't be fooled into thinking that the speed of the pen means that the plotting will be done quickly. How fast a plotter plots depends more on the speed of the host computer.

In the following selection of plotters we have picked out some of the more interesting points. The similarities between plotters would otherwise mean a great deal of boring repetition.

Before you go shopping for a plotter you ought to limit your choice as much as possible by asking yourself a number of questions: 'What size of plotter do I need? How much space have I got? How accurate does it need to be? How fast? How colourful? How much will it be used and what for? And so-on . . . until the final questions: How much am I prepared to spend? The following selection is intended to be a guide to what you can expect for your money.



Mannesmann Tally

Launched during the summer Mannesmann Tally's new Pixy III Graphics Plotter has local intelligence through the Z80 processor. This gives it the ability to automatically plot a variety of curves. It has nine character sets, the Greek alphabet and scientific symbols as well as nine line types and 15 character sizes with four directions of rotation.

It is a desk top, flat bed plotter with three pens and the facility to introduce more pens manually. The Pixy III costs around £599 with Centronics interface or £649 with serial connections. Other interfaces are available but must, of course, be specified before ordering.

Price: *£600-£650*
Address: *Mannesman Tally, Molly · Millars Lane, Wokingham, Berks.*
Tel: *0734 788711*

Epson UK

This is a dot matrix printer which can print at a rate of 160 characters per second and there are a number of type faces that can be used. There is the full 96 character ASCII set and a maximum of 137 characters per line depending on the print size. The interfacing is either by Centronics 8 bit parallel, IEEE or RS232. It is a bidirectional printer in the text mode, but will print in only one direction in the graphics mode. There is a small RAM capacity capable of holding up to 256 user-defined characters. If additional characters are not required, the RAM is used as a 3K input data buffer. Along with this there is also 12K ROM which means that any of nine bit image modes are program selectable and they can all be used in the same line.

The number of characters per line, the number of columns per line and switching from one language to another (there are nine languages altogether) is quick and simple.

Company: *Epson (UK) Limited*
Address: *Dorland House,*
Wembley, 388 High
Road, Wembley,
Middlesex HA9 6UH
Tel: *01-900 0466/9*

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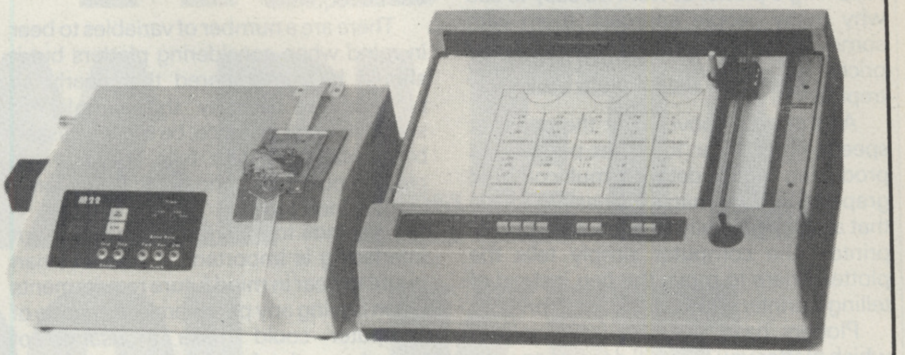

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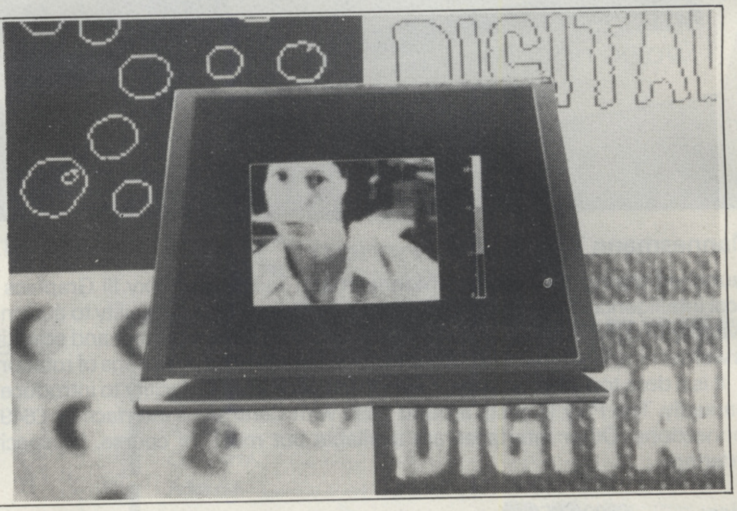
The ORTHOLOG MODEL 383 TV Interface is the fastest on the market: it collects images in one frame time (1/25 second), thereby letting you examine either static or moving scenes. It contains a 128-by-128 pixel, 6-bit data store: a comprehensive software package is provided which contains routines for displaying black-and-white images or images with 5 or 10 grey levels, data transfer to and from disk is available and images with 64 grey levels can be recorded photographically. Separate programs are available for object counting, area and perimeter measurement, contouring and velocity or displacement sensing. The Model 383 costs only £850 all-inclusive and the measurement programs are £100 each: demonstrations can be arranged. For more information contact:



Ortholog Ltd., PO Box 72, Edgware, Middlesex HA8 6RD. Tel: 01-952 2459

PLOTTERS

Radan Computational

Radan Computational Limited have a couple of plotting systems called System 1 and System 2 which can both be accompanied by Radan Data Plotting Software.

System 1. This is made up of a Hewlett Packard interactive digital plotter with an A4 plotting area, one box of paper and an instruction manual.

The cost of the system is £1,120 plus VAT for the plotter and initial supply of consumables.

System 2 consists of a Tektronix interactive digital plotter, tutorial disk describing the system use and simple plotting routines in BASIC, 12 plotter pens, digitising magnifier, one box of paper and an instruction manual.

There is a high plotting speed of between 40 centimetres per second and 55 centimetre per second with a resolution of 0.127mm. Paper is held down electrostatically and the interface connection is usually IEEE although RS232 is also available. The cost of the system is £3,495 plus VAT for the plotter, tutorial disk and initial supply of consumables.

For each system, the data plotting software is available separately and costs £300 plus VAT.

Company: *Radan Computational Limited*
Address: *19 Belmont, Bath BA1 5DZ*
Tel: *0225 318483*

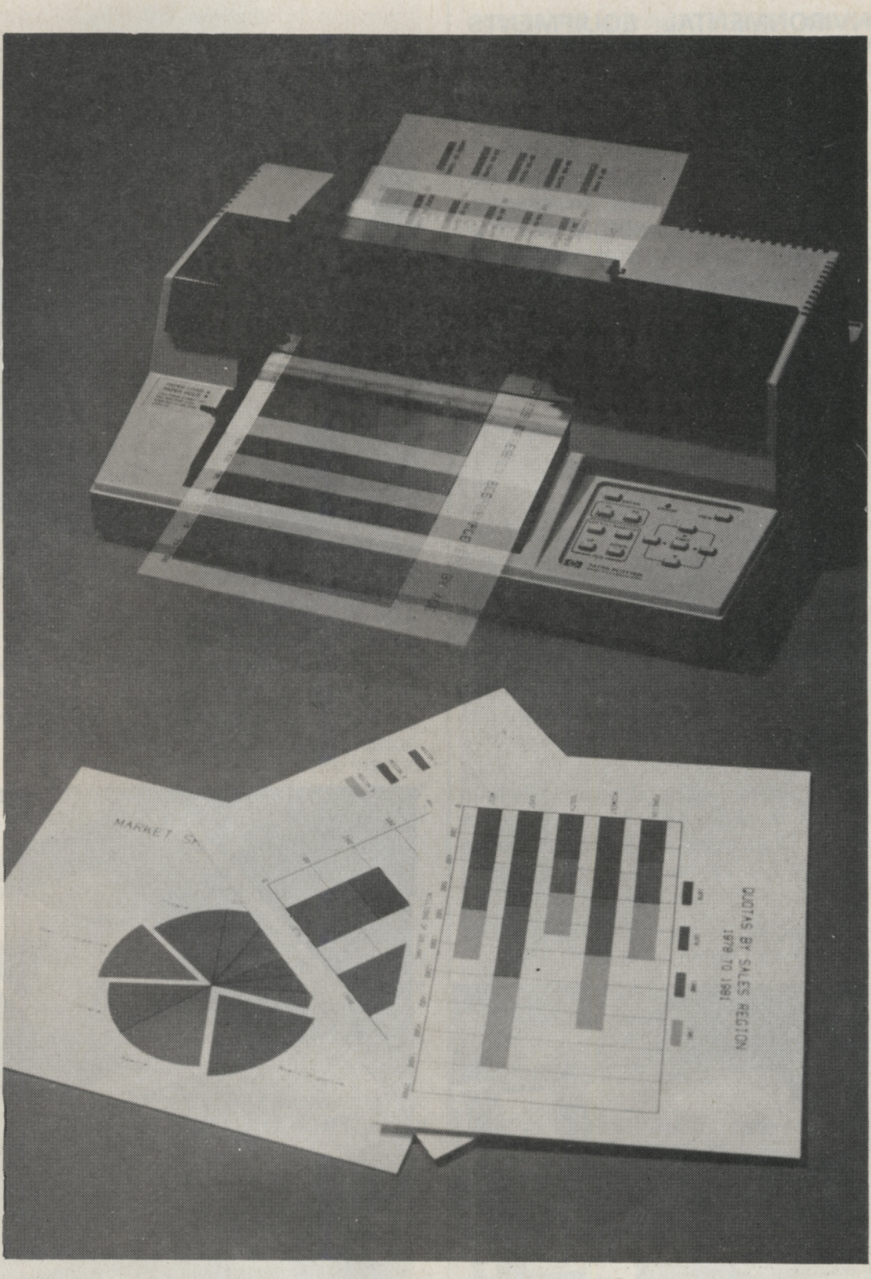
Itoh Electronics

The CX4800 from C. Itoh Electronics is a compact, high performance drum type printer/plotter which houses a built-in character generator.

The plotting speed is 120mm per second and the printing speed is eight characters per second.

The CX6000 is a flat bed type plotter with two more pens added to enhance its visual appeal. The plotting speed of this particular model is up to 100mm per second with a printing speed of three characters per second. The pens have to be water based ball point pens or water or oil based plastic tip pens and the interface needed to connect the CX6000 to your micro can be either Centronics eight bit parallel or RS232.

Company: *C. Itoh Electronics Co. Limited*
Address: *Beacon House, 26/28*
Worple Road,
Wimbledon, London
SW19 4EE.
Tel: *01-946 4960*



Hewlett Packard

The 7470A plotter from Hewlett Packard is basically a two-pen plotter but with the facility for introducing more pens manually. It has five internal character sets and is fast with pen speeds of up to 15 inches per second.

It is designed to fit on a desk but operates on the drum principle. It is intelligent with 40 HP-GL (Hewlett Packard Graphics Language) instructions built in. There are two interface options, RS232C or IEEE, which are built in so, in common with other plotters, you need to specify the interface before you order.

The 7470A plotter uses A4 size paper or film and has a resolution of 0.001 inches.

Price: *£805*
Address: *CS Computers, 12*
Wokingham Road,
Reading, Berks RG6 1JG.
Tel: *0735 74774*

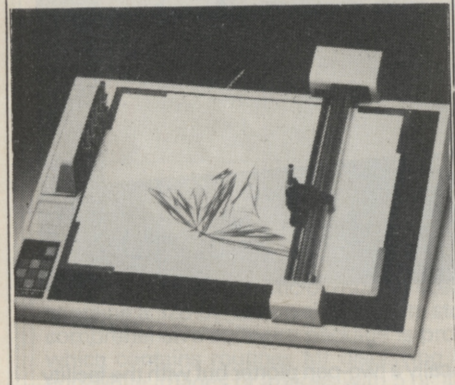
PLOTTERS

ENVIRONMENTAL EQUIPMENTS (NORTHERN) LIMITED

The Plotwriter is an A3 size drum plotter which costs £1,531 plus an interface which can be either RS232C, IEEE or Centronics. There is a choice of 45 commands. The printer has four pens and prints at a speed of seven characters per second in European, Greek and Katakana type faces. The speed of plotting is 200mm per second.

The Digiplot II a new plotter also from Environmental Equipment, is an A3 size 6 pen plotter that costs about £800. The speed of the pen can be set to a maximum of 150mm per second and can be varied down in ten steps to a minimum of 15mm per second. All of the pens are picked up by a magnetic release system. There are 28 intelligent functions all together including symbols such as circles, stars and diamonds. Two hundred and fifty four different character sizes can be selected on the Digiplot II, the smallest being 0.7mm x 0.4mm and the largest being 177.8mm x 101mm.

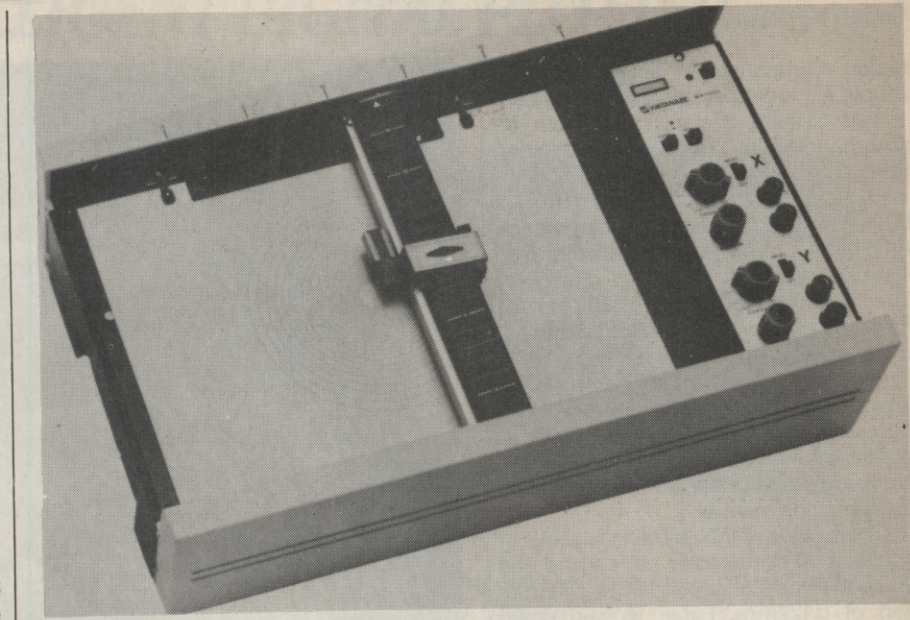
Connecting to the computer is either by the IEE, Centronics or RS232C.



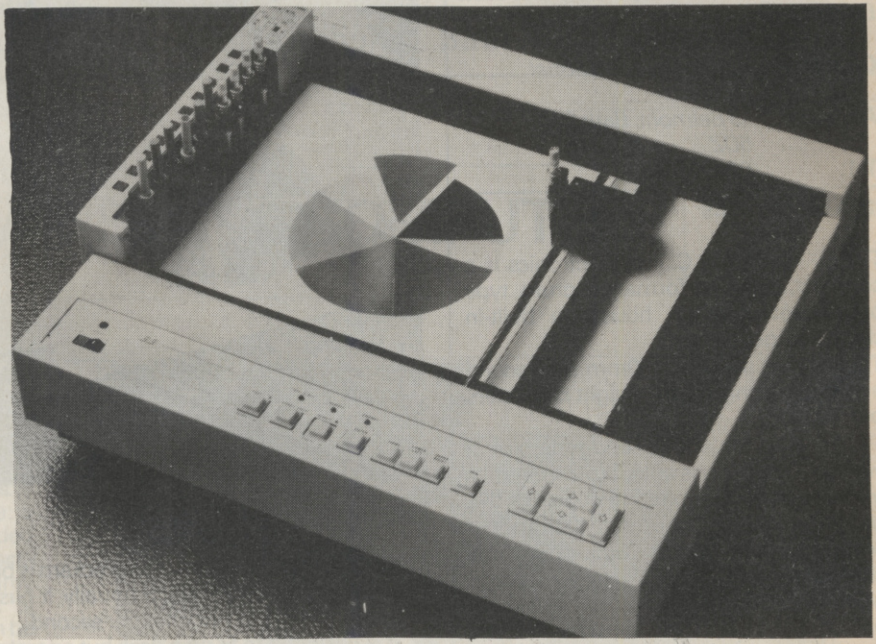
Company: *Environmental Equipments (Northern) Limited*

Address: *Environ House, 64 Welsh Row, Nantwich, Cheshire CW5 5ES*

Tel: *0270 625115*



The WX1000 has a chart area of 250mm × 180mm and a disposable fibre tip pen that can be raised and lowered remotely by applying an external control signal. An integral part of the WX1000 are the built-in X and Y amplifiers that provide measuring ranges of 0.5V/cm up to 5V/cm with + or − 0.5% accuracy of full scale. This portable lightweight plotter can be mounted on to a rack with the mounting hardware available separately. It accepts A4 size paper and costs £654.



The plotter WX4636 is an A3 size 10 pen model that has 43 intelligent functions. This is available in either a flat bed form which holds individual sheets down by an electrostatic holder, or in a roll chart version with a continuous feed of paper. The pens can be either fibre tip, ball point, roller ball or drafting ink pens with pen speed at a maximum of 400mm per second. RS232C, Centronics or IEEE interfaces apply, the interface incorporating a 1.6K byte buffer memory.

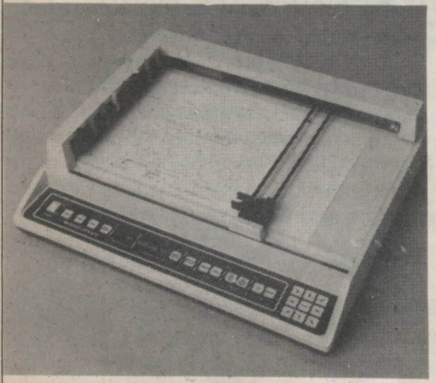
The plotter moves in 0.1mm steps providing 9.5 million possible addressable points on the plotting area. Eleven different type fonts can be selected and characters can be rotated and italicised. Bar charts can also be drawn. The WX4636 has the ability to digitise command which can be fed back to the computer for storage and retrieval. The cost is £2,673.

PLOTTERS

The House of Instruments

DMP-29

This model handles tape verification, architectural drawings, business graphs and charts, engineering drawings and many more. There is a choice of five sets of characters. This will plot according to the limits set by the user so you can plot select portions of a drawing. The front panel is a membrane keyboard that houses 21 functions. There is an addressable step size as fine as 0.0125mm and a maximum of eight pens. The dimensions of the plotter are 5.5 inches × 22 inches × 19 inches with a weight of about 25 lbs. The cost (excluding packaging and delivery) is £1,990.



DMP 40

On this plotter manual entry and control are via a membrane keyboard on the front whilst connection to the computer is provided by an RS232C interface. Normal and Italic characters can be drawn at any of the 360 possible angles and 255 sizes. There is an extensive self test and diagnostic repertoire. Only the one pen can be attached to the plotter at any one time and this pen can be a hard nib, ball point or film ink although pens have to be changed manually. The price of the DMP 40 is £865.

As well as marketing the DMP-29 and DMP-40 from Houston Instruments (see Sintram Electronics) this company also sell the 4500 Microscribe. This is an intelligent strip chart recorder with either one or two pens. All the parameters, chart speed set, pen up, pen down and event mark are easily set on the membrane panel as well as being addressable through a combined RS232/standard parallel printer port for remote control. There is an LCD display that informs the operator of recorder parameters and status and fault messages are produced when errors are detected. An internal standby battery provides the power to the processor in case of power fluctuations.

Company: *House of Instruments*
Address: *Clifton Chambers, 62*
High Street, Saffron
Waldon, Essex CB10
1EE.
Tel: *0799 24922*

Sintrom Electronics

The range of plotters produced by Houston Instruments are marketed in the UK by Sintrom Electronics. Known as the Hiplot DMP Series the plotters which are relevant to Commodore users begin with the DMP-3 and DMP-4, both A4 plotters and both intelligent. The RS232C interface is fitted as standard but Centronics or IEEE interfaces are available as options.

Both plotters utilize the DM/PL instruction set which, like those utilized by other plotters was evolved as a means of reducing the software burden on the host computer. It may be used with BASIC, PASCAL, FORTRAN and many other languages.

The DMP-3 is software controlled which is intended to reduce the amount of operator intervention. The DMP-4 has all the features of the DMP-3 as well as manual controls for pen positioning.

The DMP-6 is the A3 equivalent of the DMP-3 and the DMP-7 is the A3 equivalent of the DMP-4.

Eight-pen versions of all the above A3 plotters give a full colour facility but a conversion kit is necessary to convert the A4 models to six-pen operation.

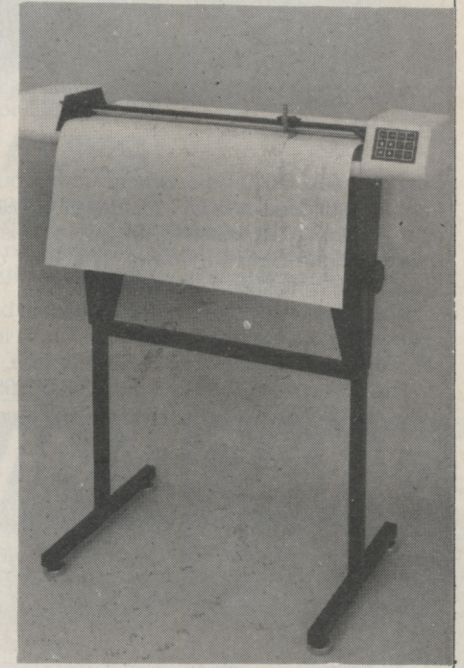
The Hiplot DMP-8 and DMP-9 are versions of the DMP-6 and DMP-7 respectively with a frame advance feature for multi-plotting capability. This enables paper to be advanced from one half-page to full page under remote or manual control.

Two of the most recent additions to the Hiplot family are the DMP-29 and the DMP-40. Like the others described so far in the Hiplot range the DMP-29 is a desk or table plotter and is designed to carry out tasks found in more sophisticated plotters but at a lower cost.

With A3 and A4 plotting formats it plots on paper or Mylar film and provides eight-colour graphics. It is an accurate plotter with a fast pen speed and there is no need to stop the plotter for a manual change of pens.

Firmware-generated features provide character generation for up to five character sets and the DMP-29 copes automatically with curves. It has scaling capabilities, allows windowing and has automatic clipping facilities to cope with drawings larger than page size.

The DMP-29 has an RS232C interface and is able to act as a digitiser by reporting pen position back to the computer. Prices for the DMP-29 start at £1,625.

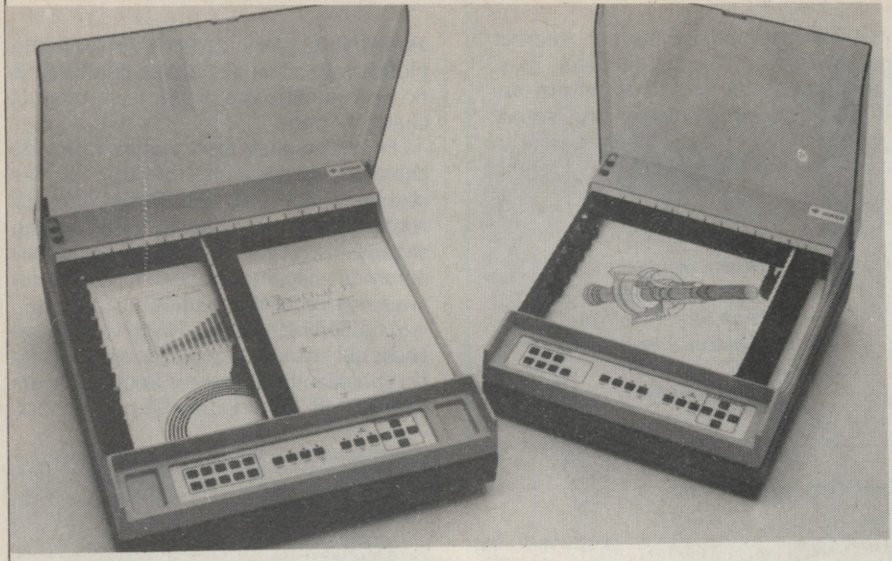


The DMP-40, like its sister machines the DMP-41 and DMP-42, is specifically a graphics plotter and the paper or film is driven across the drum under a laterally moving pen. In many other respects it is similar to the DMP-29 except for those limitations imposed by the drum operation. Prices start at £865.

The DMP-41 and DMP-42 are the professional versions of the DMP-40. They are much bigger and are free-standing on their own pedestals.

Sample prices: *DMP-29 £1990; DMP-40 £865.*
Address: *Sintrom Electronics*
Arkwright Road,
Reading, Berks RG2 0LS
Tel: *0734 875464*

PLOTTERS



Gould Bryans

The DS7 and DS10 Colorwriters from Gould Bryans are A4, 7 pen and A3, 10 pen instruments respectively. A feature of the Colorwriter is a buffer memory expandable from a standard 2k words to 16k words. This allows complicated plots to be transferred quickly to the buffer memory. The host computer can then proceed with further processing while the plotter works away.

It can also be used as a digitiser, feeding back pen positions to the computer. HP-GL is used and there are five character sets built in. Pen speed is fast and connection is via a standard RS232C or IEEE 488-1978 interface.

The DS7 costs £1,595 and the DS10 £1995, excluding VAT. Gould Bryans also supply interchangeable interface modules at £295.

Price: *DS7–£1,595; DS10–£1,995 exc. VAT.*
Address: *Holdene Ltd, Bray House, Leicester Place, Leeds LS2 9BH.*
Tel: *0532 459459*

Future Music

The first of the three DXY range of plotters from Roland DG Corporation is the DXY-100R plotter that does tabulation, automatic measuring and data processing, graphic drawing etc. It has a plotting area of 360 × 260mm and a speed of 70mm per second. There are 14 control commands as well as eight vector commands and five character commands. The vector commands allow for plotting and tabulation as well as drafting continuous lines, dotted lines and coordinates. The five character commands allow the selection of English capital or small letters, numerals, various other symbols and their size. A built-in self-test function checks performance and operation. Centronics specification print compatibility only.

The DXY-800 and the DXY-101 are both multi pen plotters that have a range of 360mm × 260mm. The maximum plotting speed for each plotter is 180mm per second with a two speed selection setting to support the type of pen and paper used. The DXY-800 is provided with eight different colour pens as well as four pen holders and paper holder for easy paper setting. On the interface side of things, both RS232C Serial and Centronics parallel interfaces are standard fixtures.

Company: *Future Music*
Address: *10 Baddow Road,*
Chelmsford, Essex
Tel: *0245 352490*

CBM
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JJ Instruments

The PD4 is a compact A4 format digital plotter from JJ Instruments who have borne the Commodore machines in mind throughout the design and production of the plotter. The standard software was originally designed for the PET but they now produce software for other computers.

It operates via an IEEE-488 interface bus and software is supplied in ROM and, in common with the extra software or the local intelligence of plotters from other manufacturers, adds several commands to the BASIC interpreter.

The pen speed is fast and the plotter accounts for data that would take it off the page and the pen raises automatically.

Price: *£596 Basic Unit ex works*
Address: *JJ Instruments,*
Brook Avenue, Warsash,
Southampton SO63 6HP
Tel: *Locks Heath (048 95) 4221.*

THE BEST 64 SOFTWARE

We offer the best software for the Commodore 64. Much of it comes from our own programmers, but we also market the best software we can find from other software companies. So if you want the best, take a look at our catalogue.

BUSINESS SOFTWARE

In our opinion the 64 is one of the most powerful business machines around. Don't be fooled by the price – just make the most of it! If you want a spreadsheet program that's powerful, but easy to use, try BUSICALC 2. At £69 plus VAT on tape or £71 plus VAT on disc it is much cheaper than comparable programs – and so easy to learn that you'll hardly need to use the excellent manual.

For your word processing needs we recommend VIZAWRITE. We can now offer VIZAWRITE in a cartridge at £79.95 including VAT (store text on tape or disk), or for disk users only we can offer VIZAWRITE and VIZASPELL on one disk for just £99.95 including VAT.

PROGRAMMING AIDS

If you can't afford a disk unit – but find tape loading tedious, you need the ARROW cartridge which will LOAD or SAVE programs at 7 to 8 times normal speed (programs must first be SAVED using ARROW). A bargain at £39 plus VAT.

The VICTREE cartridge has over 40 programming aid commands (including a RENUMBER that works, advanced toolkit commands, and Basic 4 disk commands) all at a new low price of £49 plus VAT. Machine code programmers will probably be more interested in our ZOOM super monitor (£10 plus VAT on tape) or our MIKRO ASSEMBLER cartridge, an easy-to-use full-featured assembler plus monitor for £50 plus VAT.

ARCADE & FANTASY GAMES

We stock some of the best games around. We reckon STIX is the best arcade game ever for the 64, but our CRAZY KONG can't be far behind. We beg to disagree with a recent reviewer about KAKTUS – the graphics are very original, but if you want something really different try 3D-GLOOPER, a sort of three-dimensional P✻cm✻n game. All these machine code arcade games cost £8.95 including VAT. At the same price you might prefer our new fantasy game with sprite graphics, HALLS OF DEATH.

SUPERSOFT

Winchester House, Canning Road, Wealdstone,
Harrow, Middlesex, HA3 7SJ
Telephone: 01-861 1166

AMAZING 80-COLUMN BOARD!

We have two new boards to upgrade 40 column PETs to 80 columns – one is for small screen machines, the other for the 'FAT-40'. So now the only machines that can't have 80 columns are the very early calculator style machines with built-in cassette deck.

Either board costs just £125, but we must know which machine you have at the time of ordering. Your computer must have Basic 4.0 or be upgraded to Basic 4.0 (the Rom set now costs £55). If you need to be able to switch between 40 and 80 columns we can handle that too – for £14 you can buy an extra board that allows you to switch instantly without even opening the computer!

8032 BECOMES 8096

Our 64k expansion board for the 8032 turns it into an 8096 – yet it's less than half the size of the Commodore board! We're using the latest 64K dynamic Rams (as fitted in the 700 series) but they're still using 16k chips, hence the difference.

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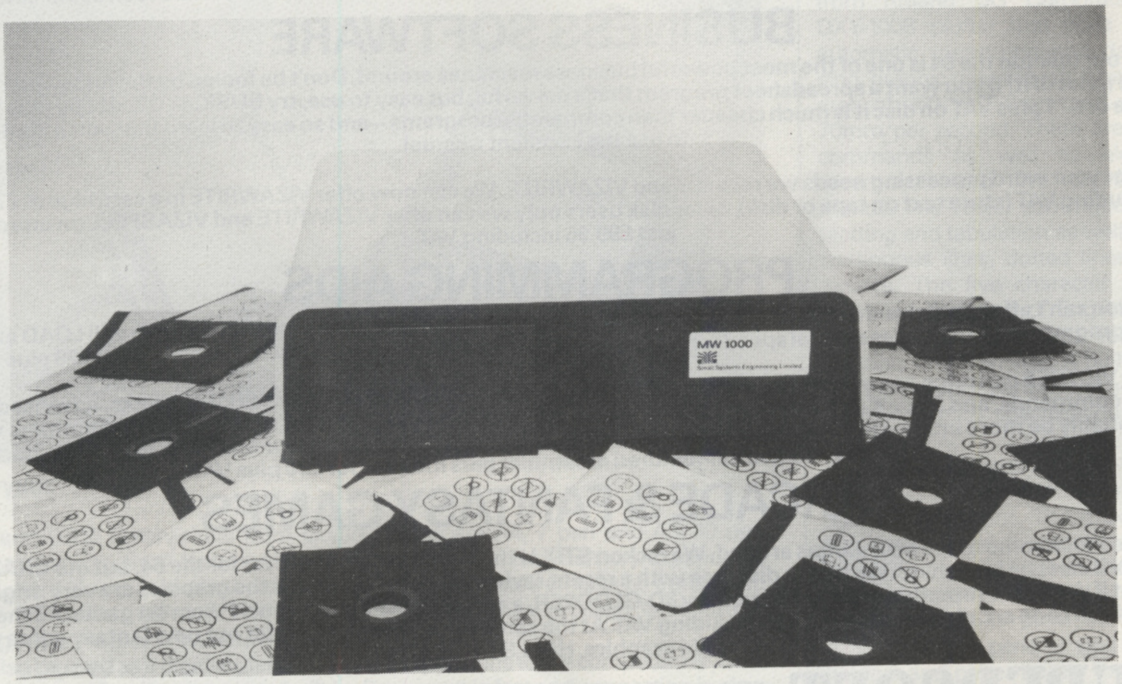

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COMMODORE 64

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Lets you program using 6510/6502 mnemonics, as easily as if it were Basic. Just enter the line number followed by the statement.

LABELS allowed with all branch and jump instructions.
VARIABLES Let you refer to data or memory locations by a name.
COMMENTS are allowed anywhere.
All function keys defined to execute commands
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SIX POWERFUL ASSEMBLER DIRECTIVES (PSEUDO OPS)

ASCII – used to enter ascii into memory
BASE – destination of assembled code
BIT – used to enter bit patterns into memory
BYTE – puts bytes of data into memory
END – defines end of source code
WORD – similar to byte, but it enters two bytes for each value given

FIVE CONTROL COMMANDS

LOAD – load your own assembler program from tape or disk
SAVE – save your own assembler program to tape or disk
DISPLAY – displays your assembler program
STOP – stop current operation
ERASE – erase your assembler program (not the assembler)

DIS-ASSEMBLER

You enter start and finish address, and that section of memory will be dis-assembled in full 6510/6502 mnemonics. Use dis-assembler to examine any of the 450 routines that make up the Basic Interpreter and Operating system.

BOOKS

A manual containing details, descriptions and addresses of all the Basic Interpreters and Operating systems 450 routines (on 16K ROM) is available for £4.99.

SAE for details
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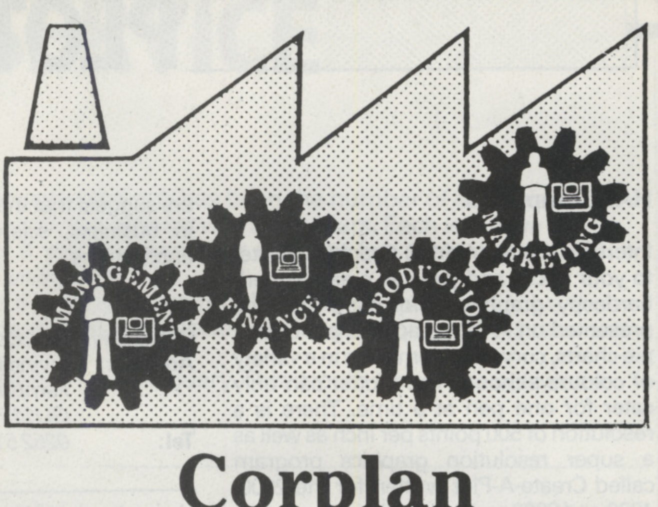

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PLOTTERS

HAL Computers

Interface the Strobe 100 Graphics Plotter to your micro and you can create superb hardcopy graphics. Information can be presented on A4 size paper as bar charts, pie charts, curves or isometrics in a variety of colours although the plotter can only cater for one pen at a time. There is a resolution of 500 points per inch as well as a super resolution graphics program called Create-A-Plot written for the 2000, 4000 and 8000 series machines.

This program comes in a disk version and allows you to create, store and draw a broad variety of charts, graphs and diagrams. The program also allows you to write titles, edit and alter your graphics to reflect additional information. Once you are finished with any form of representation you can save the information for future use or alteration. The manufacturers suggest that the plotter is ideal for use in business, scientific and educational applications.

Company: *HAL Computers Limited*
Address: *Invincible Road,*
Farnborough, Hants.
GU14 7QU
Tel: *0252 517175*

Jentech Services

The Digitmaster is a flat bed plotter from Jentech Services which can only be used with micro's of 64K or more.

Screen graphics is an optional addition to the prompt screen. This gives immediate feedback and allows easy alterations of drawings to be made on screen. The twin monitors are optional and the information can be stored on any disk from 5¼" to a hard disk. This means that drawings can be recalled and altered, rotated, enlarged, reduced and merged with another drawing. The drawings themselves are built up out of straight or curved lines, circles and arcs.

The software is a menu driven program and the output is provided via a range of 10 pens. There are several types of pen that can be used, these being water based, oil based, etching ink, roll point, fibre tip or Staedtler high speed plotting points.

Company: *Jentech Services Limited*
Address: *Nordley, Bridgnorth,*
Salop WV16 4SU
Tel: *07462 5287*

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READER SERVICE

Welcome to a new service from Commodore Computing International. Such has been the number of enquiries from readers seeking expert advice that from this issue we are introducing a new service for readers. Each issue we will be setting aside space for answering your queries. Don't worry if you're a beginner and you feel that your question sounds a bit stupid. We were all beginners once – and some of us still are!

If you have any questions about Commodore machines or a programming problem that you just can't solve then write to us at the address on this page and we will do our best to give you an answer – as long as your query is relevant to Commodore machines, of course.

We promise to do our best but we may not be able to answer every single query. This month we advise someone who thinks he's got a unique Commodore machine!

Q

Dear Sir,

I realise your publication has no connection with CBM, but with your presumed inside knowledge you may be able to help me.

I am the unfortunate owner of a Commodore 500 and although very pleased with the machine itself, can get no information from my dealer or CBM, about its future, if any. Do you know what is happening and will it still be manufactured and does anybody produce hardware or software for it?

I have had the machine for months and seen nothing in the way of publicity since. To increase my suspicions, its serial No. is 00001. Does anyone else own one of these or is it unique?

I would be grateful for any information you can offer.

Your faithfully

J.F. Moseley
COVENTRY

A

I can quite easily see why you are worried. The facts as we know them about the 500 is that about 1000 machines were produced but after them, CBM decided not to continue with the machine.

This answers the question that there must be somebody else out there who owns a Commodore 500. As to the question about hardware and software, I do not believe that the 500 had been out long enough or that there are enough owners out there to allow manufacturers the chance to produce anything for the machine.

To be quite truthful, we at CCI have not even seen a 500 ourselves. I am sorry that I cannot help you further.

WRITTEN ENQUIRIES

We will do our best to answer readers' queries in the pages of the magazine. Much as we would like to we can't really commit ourselves to giving individual personal answers – so no stamped addressed envelopes please! Don't worry if a reply to your query does not appear immediately in the very next issue of the magazine. When we receive a number of queries on the same subject it will indicate that there is general interest in that subject and we intend to publish features on such subjects. This will enable us to examine the problems at some length.

TELEPHONE ENQUIRIES

If you are really desparate for an answer and feel you really cannot wait for a published reply you can use our telephone enquiry service. We will have two of our staff standing-by every Thursday afternoon between 2 pm and 5 pm. That's when we want to hear from you.

THE ADDRESS TO WRITE TO IS:

QUERIES, Commodore Computing International,
167-169 Great Portland Street, London W1.

THE TELEPHONE NUMBER TO CALL IS:

01-636 6531 (remember – Thursday afternoons, 2 pm till 5 pm)

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C.C.I SOFTWARE

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CBM 64 QUALITY SOFTWARE

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